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## Recruiting for the Railways

A CUTE shortage of staff has caused British Railways to try the expedient of a bonus to railwaymen who bring in recruits to the railway service. The scheme is provisional, in force in the first instance until the end of October; it is restricted to certain areas of Great Britain where the railway manpower shortage is most serious, notably in districts such as that around Birmingham where other, more attractive employment is easily obtained; and the departments for which recruits are needed are motive power, traffic, civil engineering, and signal and telecommunications. A railwayman who secures a recruit in one of the specified areas receives 10s., and a further 10s. when the recruit has completed two months' service. It is hoped in this way to alleviate not only the staff shortage but also the difficulty of excessive manpower wastage through quick turnover. How far this new expedient will succeed depends largely on the existing railway staffs, in whose power it lies to paint for the potential recruit, not only an attractive picture of life in railway service, but a truth-

ful one, if the recruit is not to resign soon afterwards—and a sober account of life on the railways, with its many advantages—of which security and perquisites such as free or reduced rate travel are but two instances—apart from the interest of the job, need not be devoid of attraction or interest. Besides this, railway servants must see that what is promised to the recruit is made good, not only for the sake of the second 10s., but in the interest of the community, for whom an efficient, because adequately staffed, railway system is a necessity for many reasons. In some districts, where staff shortage has caused long hours of overtime, the bonus scheme may be welcomed by existing staff with some enthusiasm. It cannot do much more than alleviate the situation, for which other measures are already under discussion; these include the question of lodging turns and others which have been discussed since February last by the Railway Executive and the railway trades unions under the agreement then reached to make all possible economies in manpower, and the more recent proposals for voluntary working in certain cases of a 48-hr. week and for introduction of Italian labour. In addition, there is the possibility of deferment of military service for railwaymen, on which a decision by the Government is now due.

## Dearer Steel

THE increases in steel prices, ranging from 19½ to 25 per cent., which took effect last Monday, are ascribed in part to the increases in British Railways rates in May, 1950, and April last, though the steel producers could for some time accommodate these increases by means of economies in other directions. Their effects on both the railways and the railway industry of this country can only be inflationary. The additional annual cost to British Railways is estimated to be some £1.5 to £2 million, which presumably will be reflected in due course in an application for higher charges. The railway rolling stock and material industry, which plays so important a part in the export drive, will be affected in competition with foreign firms. Largely as the result of the devaluation of sterling in 1949, when the prices of American steel products were raised far above British prices, the rise of the latter as the result of the new increase will not reduce the differential to any dangerous extent; this will also be the case with Belgian and French prices. As regards Germany, the new British prices may exceed German prices until the expected rise of the latter in the near future. The outlook nevertheless for the railway export industry in Great Britain has certainly not improved.

## An American Looks at British Railways

THERE is often a tendency to compare conditions on American and British railways to the detriment of the latter. On more than one occasion we have expressed the view that a comparison between the two railway systems is not merely fruitless but often gravely misleading, because of the very wide differences in conditions which obtain. It is, indeed, usually fruitless to attempt a comparison in any detail between diverse railway systems in any part of the world, for in practically every case each has its own individuality, practices, and, above all, problems. It is, nevertheless, interesting to record the views of those who travel by British Railways after being accustomed to other systems. Elsewhere we reproduce portions of a letter written by a widely-travelled executive of a prominent American corporation to Mr. John Elliot, Chairman of the Railway Executive. The author has just completed some fairly extensive travelling in this country, and has a good deal to say on his impressions. Most of them were favourable, and in some things it is clear that we do not lag behind America. His comments on the relative cleanliness of British coaching stock and that of "some of the suburban trains out of New York" and elsewhere in particular are interesting. He also seems to have fared well in our restaurant cars.

### An Appeal to Rhodesian Railwaymen

**E**VER-INCREASING traffic, on the Rhodesia Railways, augmented by special demands and hampered by extreme dearth of African labour, has brought about a difficult situation which is likely to continue until the end of the year. Sir Arthur Griffin, the General Manager, has issued an appeal in which he asks the staff to make a special effort to get more work out of existing equipment and facilities and in particular to stop any avoidable holding of loaded wagons. In this the public is asked to co-operate by speedily releasing wagons. There should be adequate wagons to convey the traffic offering, but only if they are kept moving, a difficult matter because shortage of motive power—which will cease when the locomotives on order in the United Kingdom are received—and of yard and other facilities hinders maximum movement. The rapidly-expanding economy of the Rhodesias is producing heavy demands for the import of general goods, both from South Africa and overseas, and internally. The railways are now moving 76 per cent. greater tonnages of this traffic than in 1946.

### The C.I.E. Hotels Department

**T**HE increase in travel since the war and the improvement in the standard of living in the Republic of Ireland have greatly increased the turnover of the Hotels Department of Coras Iompair Eireann, which rose from £127,000 in 1944 to £320,000 last year. Many improvements have been made to the six hotels owned and operated, at Parknasilla, Kenmare, Killarney, Galway, Mullany, and Sligo. Public rooms and staff quarters have been modernised and extra bedrooms and bathrooms provided. Modernisation of the 22 station refreshment rooms and buffets has begun. Thirty-three services have restaurant car facilities; the cars include the four which were taken over by the Great Southern Railways from the Pullman Car Company in 1930 and now provide as many as 140 luncheons per journey. It is hoped to have in service by next year three new buffet cars, with miniature buffet bar containing beer cooler, ice-cream storage unit, and refrigerator. A new kitchen car is to be included in the popular Radio Train.

### The New Johannesburg Station

**O**N August 20 the first portion of the new station at Johannesburg—the fourth on the same site since 1892—will be opened. The changeover from the existing high-level station to the new, low-level, portion of the future station adjoining and built on ground formerly occupied by the Wanderers sports arena, begins on August 18 and will be carried out in stages. The scheme will not immediately provide additional tracks and platforms, as the present tracks and platforms will fall out of use, but in about nine months' time two extra tracks and platforms will be added. Ultimately the new station will include 14 main platforms, compared with eight in the old station, which will be abandoned. There will be almost three times as much accommodation for parcels and luggage traffic, and facilities for handling will be greatly simplified and improved.

### Euston Train Arrival Bureau

**T**HE train arrival indicator and waiting hall recently inaugurated at Euston, of which some account appeared in our June 22 issue, with some details of the projector on other pages this week, is probably unique as an installation designed solely for the convenience and comfort of those awaiting the arrival of trains. The projector apparatus, designed by Mr. J. M. Harrison, Architect of the London Midland Region, combines simplicity with remarkably low initial and running costs. The waiting hall achieves a high standard of comfort, with its fluorescent lighting and cheerful colour scheme. It also embodies some novel features, such as use of the heat from the indicator projector bulbs to heat incoming air in the air-conditioning plant in winter, and the non-reflecting glass

windows at the rear, which afford a view of the indicator screen without having to enter the hall. In addition, use has been made of revenue-earning space by provision within the hall of illuminated merchandise display cabinets.

### Improving the Riding of Motor Bogies

**T**RAVELLERS who criticise the riding of multiple-unit trains at speed can be assured that the subject is receiving close attention. As much importance is attached to the adverse effects of lateral oscillation of the bogies as to the unsprung weight of the axle-hung motor mentioned by a correspondent in our July 27 issue. In the latest motor bogies for the Italian State Railways, and also in Sweden, rubber pads have been used for lateral springing of the motors. Rubber elements are applied for a similar purpose in the British Railways mixed-traffic diesel-electric locomotive No. 10800, where they are placed at an angle in the nose suspension so as to afford side control of the traction motor mass, and also form a resilient anchorage on the bogie frame for an arm at the opposite end of the motor carcase which similarly limits movement relative to the bogie. Experiments with suspending motors so that they are sprung vertically are now in progress in this country. Opinions vary as to the necessity for adopting fully spring-borne motors and a flexible drive. Useful comparative data should be available from the performance of the S.N.C.F. stock being built for the South-Eastern Region Paris suburban services, half of which will have a flexible transmission and the remainder axle-hung motors with resilient gearwheels.

### Commutator Maintenance in Switzerland

**A** METHOD of trueing up the commutators of traction and auxiliary motors without removing the machines from the locomotive has been developed in the Lucerne workshops of the Swiss Federal Railways. The appliance designed for this purpose is arranged for mounting on the traction motor itself, and the locomotive is placed on the wheel-drive mechanism in the shop, so that the armature can be rotated by this means. Advantage is taken, also, of the existing dust extraction system for removing the copper fragments produced by the action of the high-speed steel tool. The feed being automatic, the operation is completed in one cut of about 20 min., and the accuracy is stated to be in the region of ten-thousandths of an inch. According to the *Bulletin des C.F.F.* the four traction motors of a Class "Re 4/4" locomotive can be dealt with by this method in an overall time of eight to ten hours. For trueing up the commutator of an auxiliary motor, one brush-holder is removed, and the appliance, fitted with an insulated tool, is mounted in its place. The motor is driven at reduced voltage during the cut. In addition to the advantage of time-saving compared with dismantling motors and trueing commutators on a lathe, the system has been found to result in longer life of brushes.

### A Combination of Unfavourable Factors

**T**HE derailment near Mansfield on September 2, 1950, could not be attributed definitely to any one particular adverse circumstance or specific defect in train or track. As will be seen from our summary in this issue of Brigadier C. A. Langley's report, there was no question of excessive speed and neither engine nor track showed anything more than comparatively minor faults, except perhaps the absence of any effective control over the pony truck. The "N2" class engine has been known as one liable to hunt, and derailments have occurred with it, although on main-line suburban working out of Kings Cross, over track in first class condition, it has caused no trouble. The variations in cross level in the track would not by themselves have accounted for the accident, and Brigadier Langley considers that the unusual conditions prevailing "could only have been produced by a synchronisation of all the unfavourable factors at the same time." He also considers that any question of an obstruction on the track may be ruled out and recommends that speed of the "N2" class engines be limited in future on secondary lines.

### Fourteen-Coupled Locomotives

WHEN, 20 years ago, it was known that a 2-14-4 steam locomotive was in the initial stages of construction at the Krupp works for the Soviet Union, it was commonly felt that zeal for something unusual had outrun discretion, a feeling that did not change as years went by and the locomotive did not appear. Customer and builder did not see eye to eye as to detail design and probable performance, and construction eventually was transferred from Essen to the Lugansk works in the U.S.S.R., the order then being increased to two. Several years before the war at least one of the two locomotives was completed, but the wheel arrangement had been altered to 4-14-4, and in that guise the locomotive was described in our issue of December 6, 1935. This locomotive never fulfilled the terms of the specification by hauling 3,000-tonne coal trains to accelerated schedules between the Donbas and Moscow; yet seven coupled axles still had some attraction, and during the war Schichau, at Elbing in Eastern Germany, prepared a design for a stoker-fired 2-14-0 locomotive for war service over lightly laid lines—a machine with a coupled wheelbase of 9·3 m. (30 ft. 7 in.), the fourth and fifth pairs of wheels to be flangeless. It was hoped to run this machine, with a five-axle tender, round curves of 140 m. (460 ft.) radius on standard-gauge lines; but sanction for construction was not given, and five coupled axles have not been exceeded for new construction in the last six or seven years on ordinary lines.

### Railways in South-East Scotland

THE "Scientific Survey of South-Eastern Scotland," issued in connection with the recent meetings in Edinburgh of the British Association for the Advancement of Science, contains a chapter on transport by Mr. H. P. White, of the Department of Geography, Edinburgh University, with a section devoted to railways. Because South-East Scotland was a preserve of the former North British Railway and its successor the L.N.E.R., and the rival Caledonian (later L.M.S.) only entered the Edinburgh area from the south-west, the railway system, Mr. White points out, is relatively simple and rationally laid out. Only between Edinburgh, Leith, and Granton were competitive lines built and British Railways are now saddled with redundant branches.

Five main lines meet at Edinburgh, four of which form important links in through routes: the East Coast, the Waverley, the Glasgow line *via* Falkirk, and the Forth Bridge line; the fifth is the former L.M.S. line from Glasgow, and from Carlisle *via* Beattock. The Forth and Tay Bridges are among the most intensively trafficked sections in the region. Apart from the Forth valley, all lines include heavy gradients and sharp curves. The Waverley route traverses the double barrier of the Lammermuirs and Ettrick Forest, and south-bound trains have ascents from Edinburgh to Falahill and from Hawick to Whitrope Summit, 1 in 70 and 1 in 75 respectively. Passenger traffic is centred on Edinburgh, save for a few trains from Glasgow to Fife *via* the Forth Bridge. Rail traffic northwards from Edinburgh is at present almost immune from bus competition, though a road bridge over the Forth will alter this; and there is a frequent service, also unaffected by road competition, from the suburbs of Tayport and Newport across the Tay Bridge to Dundee. The heaviest main-line passenger services are on the Glasgow *via* Falkirk and East Coast lines, with heavy peak period traffic at Edinburgh Waverley. Local passenger traffic, apart from that across the Forth and Tay, is sparse. Few branch lines in the Border counties remain open to this traffic, and Edinburgh to Glasgow *via* Bathgate and the Peebles lines now have infrequent services. On the main lines, many smaller stations have been closed to passenger traffic, and those left open have a sparse service. The Edinburgh and Dundee line alone has a fairly frequent service of stopping passenger trains.

The Edinburgh-Glasgow line *via* Bathgate is rather more important for goods than the Falkirk route east of

Winchburgh Junction, and despite its difficulty, the Waverley route is nearly as intensively used for goods traffic, at least north of Hawick, as is the East Coast. Due to the northward movement of coal from Fife the northern section of the Dundee line is more intensively used than the southern, traffic including regular fish and meat trains from Aberdeen to Kings Cross, worked at high speed. Traffic from colliery branches is concentrated on marshalling yards at Oakley, Thornton, and Kelty in Fife, and Bathgate, Polmont, Meadows (South Leith), Portobello, and Hardengreen in the Lothians. Mr. White notes that little coal is now shipped from local ports by sea-going or coastal colliers. With the declining Lanarkshire output, much is now railed westward from Oakley and the Edinburgh yards, and some dispatched direct from East Lothian collieries to the Glasgow area. Other goods traffic includes sugar beet, among various agricultural products. Although the passenger service has been withdrawn from many branches, most remain open for a daily goods train. Even the Lauder light railway, Mr. White remarks, has recently been re-opened to traffic with the rebuilding of the bridge over the Gala Water, which was destroyed, with many others, in the floods of August, 1948.

In his historical introduction Mr. White observes that the first railway in Edinburgh, the Edinburgh & Dalkeith, nicknamed the "Innocent Railway" because of its freedom from fatal accidents, was opened in 1834, and the Edinburgh, Granton, & Leith line in 1842. The original Edinburgh & Glasgow Railway was opened in 1842, and the N.B.R. was incorporated in 1844 for a line from Edinburgh to Berwick.

### Mountain Transport by Suspension

THERE has been a considerable extension in Switzerland of mountain passenger transport by means of suspension lines, of the *téléphérique* type, with passenger cars, and also chair-lifts, with single or double individual chairs and continuous working. The advantage of both is that, although carrying capacity is limited, construction is much cheaper than that of a funicular railway; also, the most irregular mountain slopes can be negotiated without difficulty. One of the earliest *téléphériques* was in Switzerland—the Feldmann line from the upper glacier at Grindelwald to the face of the Wetterhorn—but it lasted only from 1908 to 1914, when damage from avalanches caused it to be closed.

From then onwards, although many *téléphériques* were installed in the neighbouring Alpine regions of France, Germany, Italy, and Austria, the only similar Swiss lines to be built were the Gerschnialp-Trübsee line above Engelberg, the Beckenried-Klewenalp line on the Lake of Lucerne, and the notable line to the summit of the Säntis in Canton Appenzel. The post-war activity in building chair-lifts, a development of the primitive ski-lifts, has, however, stimulated a renewal of *téléphérique* construction also. Modern chair-lifts have an even greater carrying capacity than many of the *téléphériques*, as they possess large stocks of chairs, which can be run on to the rope at any desired frequency, according to the flow of traffic. The chair-lift from Grindelwald up to First, which has four independent sections, with the chairs of through passengers transferred from ropeway to ropeway at the junction stations, until they have been lifted 3,625 ft. in a 30-min. journey, is a notable example.

In the past year alone four *téléphériques* have been added to the eight already existing in Switzerland, and seven to the twelve previous chair-lifts, making a total of 31 Swiss suspension lines. Two of the *téléphériques* for the first time provide transport up to hotels high above the north wall of the Rhône valley, at Riederalp, Riederfurka, Bettmeralp and Jungfrau Eggishorn, previously accessible only by a toilsome climb of 3,500 to 4,000 ft. A third is a daring line from Kandersteg up to the summit of the Stock precipice, cutting out the whole of the laborious ascent from the valley for walkers on the way to the Gemmi Pass.

It is difficult to understand why no attempt has been



made in Great Britain to instal either *téléphériques* or chair-lifts. Proposals would doubtless evoke protests from the exclusive mountain lovers, but the existing rack railway up Snowdon does not appear to have reduced the affection of mountaineers for scaling Snowdon by other and more energetic means. The pleasure that would be given to thousands of non-climbers by the suspension lines proposed, which would still leave large areas of mountain country untouched, ought to override the objections. Such projects might be sponsored by the railways, as they could create much excursion traffic to and from the nearest railway point of access.

### Pre-Stressed Girder Design and Testing

**T**HOUGH there appears to be a great future for pre-stressed concrete for bridges and other structures its technique is still far from finality. Research and practice—particularly in respect of railway and similar bridgework—are being vigorously advanced in many parts of the world. In India, for example, considerable progress has been made during the past two years, as will be seen from an article elsewhere in this issue. It is noteworthy that the Railway Board has equipped the Research Branch of its Central Standards Office with modern apparatus including electronic measuring instruments. Its organisation also includes resourceful and highly-qualified engineers.

The article, which is based on the Railway Board's report on the design, construction, and testing of a 40-ft. pre-stressed span, does, however, suggest certain points calling for comment. For instance, the practice of separating the pre-stressing cable from the concrete by a wrapping is now unusual as it is recognised that considerable advantage accrues from the bond secured by injecting cement mortar grout into the holes cored in the concrete. Such grouting has gained favour more rapidly in Europe than in America, and is found to be beneficial in preventing corrosion of the pre-stressing wires, increasing the ultimate resistance, and may well augment the limiting fatigue range in cyclic loading tests.

Reverting to the Indian pre-stress design, its unloaded natural frequency in vertical oscillation appears to be about 12 cycles per sec., and locomotive hammer-blow may therefore be treated as a statically applied load. The method adopted for testing by electric resistance gauges is peculiarly well suited to this particular design, and the principle of recording strain in the pre-stressing wires not bonded to the concrete is sound. Had grouting been applied, this would have not been so, because the microscopic tension cracks in the beam below the neutral axis—caused by load-

tion and render this variable. One of the other gauges 0.06 in. wide would have given satisfactory results at any rate in tests of up to about two weeks in duration.

Another important aspect of pre-stressed bridgework is its longevity and the associated question of fatigue tests. If the life of a bridge is assumed to be 80 years, and the daily number of trains exerting a maximum load on it is taken as 15, there will be fewer than half a million repetitions of capacity loading during its lifetime, provided that the trains are single-headed. On the other hand, though it would not be feasible to use a slipping locomotive for fatigue tests, the electro-magnetic oscillator could be, and often is, used in such tests on large pre-stressed concrete beams. Fatigue tests show up any weakness at the points where the main pre-stressing cables change direction. Moreover, it is conceivable that continued "working" between steel and concrete at these points may produce grooving and loss of pre-stress. Such a loss would also occur with the collapse of the spiral core. It is clear therefore that fatigue tests would greatly assist in clearing up these and probably other doubtful points.

Furthermore, it occurs to us that in future tests of pre-stressed bridges it might be advisable for the span to be loaded with dead and live load, and for the impact load to be applied by oscillator at six cycles per sec. for 500,000 cycles. It is important to measure the load delivered to the span by the oscillator from time to time during the test, and this can readily be done with pressure recording cells. Records of camber and amplitude of oscillation are also necessary and can be obtained by the ingenious methods already devised by the Research Branch of the Indian Central Standards Office. If the lower cables are grouted in, the electric resistance strain gauges might still be applied to the upper surface of the girder, to indicate fluctuation of compression stress.

### Commonwealth of Australia Railways

**T**HE report for the year ended June 30, 1950, which has been received from Mr. P. J. Hannaberry, Commonwealth of Australia Railways Commissioner, shows an aggregate working deficit of some £103,000 excluding interest charges, or £357 higher than the corresponding figure for 1948-49. It represents the collective results of the two 4-ft. 8½-in. gauge lines, the Trans-Australian and Australian Capital Territory Railways, and the two 3-ft. 6-in. gauge Central Australia and North Australia Railways. The principal financial and statistical results for 1948-49 and 1949-50 for the four lines and whole system are tabulated below:—

	Year ended June 30	Trans-Australian Railway	Central Australia Railway	North Australia Railway	Australian Capital Territory Railway	Total for all railways
Miles open	1950	1,108	771	317	5	2,201
	1949	£8,750,148	£4,519,526	£2,674,642	£88,922	£16,033,238
Cost (excluding rolling stock)	1950	£8,871,948	£4,547,045	£2,694,435	£89,567	£16,202,995
	1949	£1,604,467	£621,405	£133,411	(a)	£2,359,283
Cost of rolling stock	1950	£1,865,722	£678,621	£126,951	(a)	£2,671,294
	1949	£915,672	£714,838	£29,251	£13,541	£1,673,302
Earnings	1950	£1,013,716	£809,166	£36,920	£15,235	£1,875,037
	1949	£1,050,492	£657,153	£51,402	£17,566	£1,776,613
Working expenses	1950	£1,162,232	£725,671	£72,042	£18,760	£1,978,705
	1949	903,093	685,648	69,598	8,655	1,666,994
Revenue train-miles	1950	862,286	729,278	70,503	8,335	1,670,402
	1949	—	£57,685	£22,151	£4,025	—
Results of working (excluding interest)	1950	—	£83,495	£35,122	£3,525	—
	1949	—	£107,742	£65,383	£972	—
Interest	1950	£104,435	£132,542	£59,810	£953	£297,740

(a) Rolling stock is the property of the New South Wales Government Railways.

ing nearly to capacity—would have interfered with the uniformity of stress flow in the wires to a variable and incalculable extent. In the compression flange there is no such objection as there are no cracks, and electric resistance gauges, directly applied to the concrete, could have been used there with success. It may be noted that the Baldwin A14 type of gauge, which is 0.375 in. in width, was applied to a 0.20-in. dia. wire in the Indian tests. This would entail bending it to a 0.1-in. rad. when bonding it to the wire—a practice that would be certain to alter the calibra-

For every £1 spent in operating expenses, only 18s. 11½d. was earned, which included goods and livestock 12s. 0½d., passengers, mails and parcels 5s. 4d., and other earnings 1s. 7d.

As the result of the coal strike, which lasted for seven weeks from June 27, 1949, no New South Wales coal was received for twelve weeks; normal requirements for that period were 19,200 tons. Moreover, the quality of what was subsequently delivered was deplorable, and in May, 1950, a further shortage occurred. In 1949 a number of



Trans-Australian locomotives were converted to burn oil, and others on the Central line were temporarily adapted to burn South Australian coal and oil. Passenger train services were drastically reduced in July and August, 1949. For instance, the normal three Trans-Australian expresses weekly were cut down to one, though a second was resumed later. During these two months goods traffic from the Eastern States to Western Australia was almost entirely suspended, and the annual tonnage on that line fell from 21,900 to 18,904. This traffic is particularly difficult and uneconomical to work as 80 per cent. of it is from east to west with only 20 per cent. back loading. Similar curtailment of services had to be made on the other railways.

Orders were placed with the Clyde Engineering Co. Pty. Ltd. of Sydney for eleven Clyde-EMD 1,500-h.p. type F7 diesel-electric locomotives for the Trans-Australian Railway, similar to the standard diesel-electrics built by the General Motors Corporation, U.S.A. Delivery of these engines should enable all steam locomotives to be withdrawn from that line, as eleven diesels would be able to work all express passenger, mixed, and goods and livestock trains. Maintenance of services would then not depend on costly seaborne coal, and expensive pumping and softening of locomotive water supplies. It was estimated that 20 per cent. of the total gross ton-mileage on this railway was due to this haulage, and the substitution of diesel power would not only eliminate these items—permitting train loads to be increased by up to 27 per cent.—but also make possible faster and more frequent services and general economy in operation. Corresponding savings might be expected from subsequent dieselisation of the Central and North Australia Railways.

Meanwhile, ten "Macarthur" type steam locomotives, built in New South Wales for U.N.R.R.A. and originally destined for China, were purchased to work Trans-Australian goods traffic until replaced by diesels. They are then intended to haul South Australian coal over the proposed standard-gauge line from Telford to Port Augusta and Port Pirie. In March, 1950, the Cabinet authorised expenditure of £1,400,000 on track and bridging material for this new line, which will enable great economies to be effected in coal handling and haulage.

## The Railway Situation in the United States

(By a Correspondent)

IN June last Dr. Julius H. Parmelee, Vice-President, Association of American Railroads, gave an instructive address to the New York Society of Security Analysts on the past and prospective railway situation in the United States. With the aid of statistical tables and charts, he first surveyed traffic and earnings trends during the past 15 years. He next reviewed the conditions and factors that are bound to influence future developments, urging that the big question was the ability of the railways to withstand the growing pressure of rapidly rising costs against more static revenue levels. The most pressing problem of the immediate future was not so much that of maintaining traffic volume and movement, as it was to make enough out of railway operations to service railway investment, and finance the maintenance and improvement of plant.

Dr. Parmelee then summed up the facts and trends bearing on his subject in seven terse sentences which are worth quoting.

1. Freight traffic moved up from a low prewar level to unprecedented records during war years, and has continued at generally high levels during postwar years.

2. Passenger traffic showed an even greater rise during the war than freight traffic, but has declined more sharply since the war.

3. Operating revenues showed marked increases during the war and postwar periods; the war increase was due largely to greater degree of plant utilisation, while the postwar increase has been the combined result of sustained traffic volumes and higher rate and fare levels.

4. Operating expenses since the war, especially wage rates and material prices, have increased at a much more rapid

rate than operating revenues, thus producing an imbalance between income and outgo that has reduced net earnings.

5. Substantial time-lags have intervened between the incidence of higher costs and remedial rate increases, thus producing further losses for the railways.

6. The net result of the several factors has been a record movement of peacetime traffic, large revenues, but inadequate net earnings.

7. On the brighter side, railway debt and fixed charges have been reduced, and the capital structure of the railroads has been strengthened.

The speaker added that the railways were operated with increasing efficiency and economy. They had continuously improved their facilities and had followed a conservative dividend policy. Despite these accomplishments, railway net earnings were unsatisfactory in the present period of high industrial activity and prosperity. Elimination of subsidised competition would help to give the railways their rightful position in the public interest. If the subsidy factor were not eliminated, the question would be whether they could continue as a private industry or would follow the British railways into nationalisation.

Along with the editorial note in our June 29 issue on "Railway Capital Expenditure and Controls," the above account of U.S.A. railway prospects goes a long way to qualify Mr. John Elliot's belief that "in America there was no limitation on capital expenditure, no shortage of materials, and no manpower problem." A few excerpts from evidence submitted on behalf of the railways to the Senate and the Interstate Commerce Commission will throw further light on the position.

In April, 1950, the Senate was advised that, despite increasing efficiency of operation, "the railroads are in serious financial difficulties. Their earnings are not now sufficient to attract a continuing flow of new capital to the industry." It was then shown that net working capital (in other words, liquid reserves) had been drawn on so heavily for capital improvements that their total shrank from \$1,659 million in 1945 to \$645,000,000 at the end of 1949. That was too low an amount, because these reserves supply funds for current operating costs and for down payments of about 20 per cent. on equipment purchased through trusts. Since 1939 more money has been spent on equipment than on roadway and structures; in 1950 equipment cost \$787,000,000, about 73 per cent. of the total capital expenditure of \$1,065 million.

New locomotives, wagons and passenger cars, due to be delivered in 1951, will cost more than \$1,000 million. To pay for them over a ten-year period, including interest charges, will need more than \$100,000,000 a year. The Senate was warned that "it is a serious question whether the limit of safety is not being approached, in view of the need for liquid reserves to be maintained at adequate and proper levels."

The proceedings of the Purchases & Stores Division, Association of American Railroads, confirm the feeling that the railways have plenty of difficulty over the supply of materials. They have their manpower problems too. Early this year the I.C.C. was informed that "the carriers are currently experiencing shortages in certain occupational categories, particularly in certain skilled occupations. The supply of unemployed workers in the United States at the present time is so small that it is difficult to recruit new workers in these occupations."

The only alternative open to the railways was to resort to overtime work at premium rates of pay for all hours worked in excess of 40 per week. The cost of working in 1949 and 1950 was increased also by a series of labour disputes, which led to Government seizure of the railways in August, 1950. A number of railway presidents has served since as colonels in charge of Regions, but that did not avoid further trouble with the trade unions in the course of this year.

These official statements prove that, since the trade slump of the 1930s American railways have passed through much the same phases as our own systems. Occasionally, there has been a time-lag on one side or the other, but the fundamental problems confronting the railways have differed surprisingly little.

## LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

### Mercury Arc Rectifiers in Traction

August 11

SIR,—I was interested to note in your August 10 issue the reference made by your correspondent to the use of rectifiers on a.c. electric locomotives, wherein the criticism is made that the rectifier locomotive is heavy for the same output as compared with its d.c. counterpart. In view of the very rapid advance being made in a.c. traction, it seems unwise to dogmatize on the basis of the one locomotive quoted.

The French Railways 20,000 V., 50 cycles, a.c. locomotive No. BB 8051, described in *Notre Métier* of July 30, incorporates an arrangement of twin rectifiers and transformer with a buck-boost winding, which gives very simple control and a power output which compares very favourably with a modern French d.c. locomotive such as the BB 0401 (now renumbered BB 8001), described in the *Revue Générale des Chemins de Fer* for April, 1947.

Comparative data are given below:—

	Locomotive BB 8051 (20,000 V. 50 cycles)	Locomotive BB 0401 (1,500V. D.C.)
Nominal continuous rating (metric h.p.)	2,700 h.p.	2,400 h.p.
At (m.p.h.) ... ..	37 m.p.h.	37.5 m.p.h.
Tractive effort at above ... ..	26,500 lb. (approx.)	32,400 lb.
Total weight ... ..	80 tonnes (approx.)	80 tonnes without ballast 92 tonnes with ballast

It will be observed that with electric locomotives of this type weight is not necessarily an evil; ballast is actually necessary on the d.c. locomotive to enable full use to be made of its starting tractive effort with heavy trains on steep gradients.

Yours faithfully,

W. J. ARNOLD SYKES

Bradbourne Vale House,  
Bradbourne Road, Sevenoaks

### Some Railway Shortcomings

August 10

SIR,—Nemo's excellent letter in your July 20 issue expresses quite reasonably a certain point of view: but there is another and, to put it forward is not to contradict Nemo: on the other hand, these considerations also deserve assessment if, in the final result, any profit is to be derived from discussion. The railways, per their staff in its totality, are face to face with the theologian's age-long problem, known to him as "Vision and Authority."

That mode of expression, I appreciate, will convey little to many. Let me illustrate, if I can. One authority on such matters has said that "where there is no vision the people perish"; another, faced with evidence of this fact, broke the original Tables of the Law into fragments: a third remarked that "No man can serve two masters." And so I could go on.

As a nation we make our own laws, and get all het up with its executors. Charles said: "I deal with policy: you deal with bills," to which the Commons replied, "O.K. by us!" or words to that effect. In the result, I think, the system has worked. At any rate, every other system has failed already.

Nemo must be patient but not inactive. Never despair, Nemo.

The Executive is at present trying to pay its way, postpone renewals, make room for another carrying organisation and, jointly with it, permit third parties to abstract the nucleus of good paying traffic from the total transport

market. In that respect the Minister might consider the first theologian quoted, Nemo could enquire what happened, as a consequence, to the second, before he goes into action, and everyone of us could reflect on the implications of the statement made by the third. Perhaps we are called on to die? If so, we must remember Rupert Brooke.

If not, we must realise that there is no turning back. The individual private companies were done for, as any honest man would admit. What our proper function is to be in the future is not by any means clear, and there are too many offering to play the part of Aaron at all levels, and in many connotations—joint committees, for instance.

When I was a boy in the service, railway carters complained loudly if anyone else was allowed to work "their" horse. Their employees paid their 25s. per week and a regular 7 per cent. dividend. Everybody was delighted. The basis was a monopoly in fact as well as theory with legal control and recognition. When I was a young soldier and the officer in command did not know what to do, the sergeant shot him. I wonder why?

The other day I watched thirty "front" porters at a London terminal, which was empty, stand and ignore an old lady of over 70 walking from the street across the forecourt to the departing side with a heavy bag because, as one audibly remarked—"Twopence at the outside." Meanwhile they smoked cigarettes which cost that much each.

As Aaron found out, it isn't who you are or where you are stationed but what you do that matters. Nor does one need a committee for that. Nemo is very severe on the Executive—so were the people while Moses was absent on the mount, nor, I think, had they seen or drawn up his "agenda." The "minutes" certainly gave them a shock, especially me.

Yours faithfully,

OMEN

### Inter-Regional Transfers of Officers

August 13

SIR,—Most people will agree with your opinion, expressed in your August 3 issue, regarding the wisdom of inter-Regional transfers of senior officers, but in the case of the recent transfers from Swindon it is a commonly held belief that this was done deliberately to break down the "G.W.R." resistance to the "L.M.S.-ing" about which we all suffer under the present régime.

Most complaints now seem to arise from the refusal of the Railway Executive to admit that anything or anybody without an L.M.S.R. background has any merit. In my department I cannot quote one instance where the L.M.S.R. practice is better than our old one, and in most cases it is inferior.

Yours faithfully,

SOUTHERN MAN

[Surely "Southern Man" overlooks one important fact—both Sir Eustace Missenden, the first Chairman of the Railway Executive, and Mr. John Elliot, second and present holder of that office, were "Southern men"!—Ed., R.G.]

A SUCCESSFUL RAILWAY WEEK IN AYR.—During a recent Railway Week in Ayr several exhibitions were staged in the Carnegie Library, and in Ayr Harbour or two days British Railways turbine steamer *Marchioness of Graham* was open to the public. An exhibition of locomotives and coaching stock was held also at Ayr Station and in one day (Sunday) was attended by 2,685 people. A total of £56 12s. collected as admission charges has been allocated to various local charities. An exhibition of models and prints held in the Carnegie Library for one week attracted on the final day an attendance which established a record for any exhibition held in this library.

## THE SCRAP HEAP

### Music While You Ride

A "Music While You Ride" service has been introduced by the Belgian Railways to encourage holidaymakers to travel by train. Loudspeakers installed in the compartments relay listeners' request records.

### All in Good Time

Several motorists waited for a goods train to move past the level-crossing gates at Halwill Junction, North Devon. They waited and waited. Then they saw the fireman cross the street and climb into the engine. He had two ice-creams—one for the driver, one for himself. Then the train moved.—*From the "Daily Express."*

### First British Railway

Perhaps a passing thought might be spared as Parliament and British Railways are inextricably bound up for the occasion when they first came together. It is just 150 years ago, and as a result of their meeting permission was given at the end of July, 1801, for the first commercial railroad to be built. The matter that concerned Parliament was the making of a railway to serve works on the River Wandle, Surrey, and, after the Bill had gone through, work started on a design which more or less followed the course of the river for 9½ miles between Croydon and Wandsworth. The line went through Mitcham and Merton and a later extension went to Merstham via Purley.

The power was not steam, but horse, and the rails enabled heavy loads to be pulled easily. Indeed it was a demonstration at the opening of the extension to Merstham that is said to have convinced engineers of the future of rails and may thus be said to be an important occasion in railway history.

A horse pulled 12 loaded trucks, with a total of 36 tons of stone, for six miles, and then an additional four loaded trucks, making a total weight of 55 tons. Therefore the Surrey Iron Railway—and traces of its course can still be seen—assumes importance.

### Lost Luck

Railway cleaners totted up the horse-shoes they have found in north-west trains. Total: 50.—*From the "Sunday Express."*

### Journey of Papal Train

The 93-year-old train of the late Pope Pius IX has made what was probably its last trip. Special conveyors transported the three Papal coaches, which were built in France, a mile through the streets of Rome from one museum to another.

The first coach contains two long divans, a large grey velvet armchair, and a sort of balcony from which the Pope, who reigned from 1846 to 1878, pronounced his blessing.

### Service in Scotland

While returning from holiday in Sutherland on July 14 a woman passenger from Glasgow joined the 11.2 a.m. train at Brora Station. On the journey south she discovered that her shopping bag was missing. Before she entrained at Brora the bag had been seen on the platform, and, though not too hopeful of the outcome, her husband reported the loss to the guard when the train stopped at Dingwall.

The story is continued by the passenger in a letter to the Railway Executive: "Imagine my surprise on arriving at my reserved seat—which incidentally was arranged by the stationmaster

at Brora—on the 3.40 train from Inverness that afternoon to find a porter there with my bag and a note from the stationmaster explaining that he had made enquiries and discovered that "shopper" belonged to me and had forwarded it with the next train to be delivered to me at my seat on the Glasgow train."

### Kindness Remembered in Michigan

In 1950 Fyling Hall Station, near Whitby, won a first prize in the North Eastern Region station garden competition. Last year, also, Porter Albert Hunter was helpful to Mrs. A. C. Green, of Port Austin, Michigan, U.S.A. Mrs. Green, when she returned home, remembered this prize-winning station garden and its helpful staff, and sent Albert Hunter some petunia seeds from Florida. When the station garden judges visited Fyling Hall on July 29, they were impressed by the size of the petunias, voted to be amongst the largest that anyone had ever seen.

### Railways Delay Litigation

It is most regrettable to note that for the last few months frequent breakdown of locomotives are occurring in the metre-gauge section of the N.W.R. It seems that this section has not yet received due share of attention of the Railway Administration. In the month of June last as many as 41 breakdowns of locomotives were reported. This is causing great inconvenience and harassment to the travelling public. Advocates and the litigant public in particular are being affected. They often fail to attend mofussil courts at proper times. Will the authorities look into the matter?—*From a letter in the Karachi newspaper "Dawn."*

### Ave Atque . . . ?

What has become of — and —  
Who trod awhile the pathways rough  
Of perilous publicity  
In splendid unanimity?  
Can they have suffered the sad fate  
Of many another buffer state?

Is it "farewell"? One tender tear  
Gratefully goes on record here,  
For, by and large, I loved those boys;  
They added to my scanty joys  
With every quaint, archaic phrase  
In these austere, un-humoured days.

They brought, by their bizarre  
technique,  
A blush to Propaganda's cheek,  
Adding a touch of fantasy  
To common-place reality—  
Who else could wax so lyrical  
About a railway timetable?

You did your best, dear — and —  
But life's indubitably tough;  
Now, I suppose, some earthbound cuss  
Will tell his mundane tale to us,  
Yet, while we steel ourselves to grief  
We must admit to some relief!

PLACIDUS

### "Three Countries Corner"



A Swiss Federal Railways 0-8-0 tank locomotive shunting at Basle Docks, where Switzerland, France, and Germany meet

Photo]

[W. H. R. Godwin



## OVERSEAS RAILWAY AFFAIRS

(From our correspondents)

### RHODESIA

#### Financial

During the 12 months ended March 31 revenue over all sections increased by £2,042,394 from £10,265,782 to a record total of £12,308,176. Expenditure increased from a total of £8,701,349 to £10,154,480, leaving a surplus of £2,153,696.

#### New Rolling Stock

New all-steel second class coaches are now in service. They are similar in design to those recently introduced on the South African Railways, each having three coupés and five compartments providing sleeping accommodation for 39 passengers. The "in-service" cost is about £19,000 each.

An attractive new buffet car, designed and built in Rhodesia, has also been placed into service. It comprises a bar, and a lounge to seat twelve passengers.

### INDIA

#### Coal Loading on the E.I.R.

In its drive for a quicker turn-round of wagons, the East Indian Railway loaded 2,950 wagons with coal in the Raniganj and Jharia coalfields on July 11, 1951. This is stated to be the highest loading figure in 24 hr. since the railway came into existence over 90 years ago. The previous highest coal-loading on record was 2,728 wagons on October 12, 1949.

### ARGENTINA

#### Acts of Sabotage

Early on August 1 a series of dynamite explosions occurred on four railways, destroying tracks and interrupting services. The acts are attributed to discontented railwaymen whose strike in January was broken by conscripting them and by arresting many. Home-made bombs are believed to have been used, or sticks of dynamite attached to the rails. Emergency squads under heavy police guards repaired the damaged tracks. All railway stations have been guarded by police, and several thousand railwaymen are stated to have been arrested.

### CANADA

#### Interim Freight Rate Increase

A 12 per cent. interim freight rate increase, estimated to yield \$54,000,000 a year, recently awarded by the Board of Transport Commissioners, came into force on July 26. It is an interim measure, pending full hearings in the autumn of the railways' request for more revenue to meet higher costs.

#### Transcontinental Freight Rates

An early increase is sought in the special transcontinental freight rates between Eastern Canada and the West Coast. These rates were not included in the recent 12 per cent. interim increase,

but it is understood the railways intend to use a different procedure to raise them by the same amount.

The transcontinental rates are special sub-normal charges that have been in effect for many years. They were lowered to meet competition arising out of the opening of the Panama Canal. Much traffic is moved under them, mainly of the type that could be conveyed by sea between the two coasts; it includes canned goods, motorcars, machinery, iron and steel, textiles, and chemicals. Some of the rates from the East to the Pacific coast are lower than from the East to Prairie stations. The bulk of movement is from east to west, but there are considerable eastbound movements such as that of canned fruits and vegetables from the Okanagan Valley in British Columbia.

### SWITZERLAND

#### More Comfort in Third Class

A number of lightweight third-class coaches now being built for the Federal Railways will be fitted with upholstered seats instead of the wooden seats normally used in third-class coaches on internal services. Third-class passengers account for about four-fifths of the passenger receipts of the Federal Railways.

It may be noted, also too, and a sign of the expanding prosperity in the coun-

try, that first-class travel on internal services has been on the increase since 1948, to the extent that some shortage of first class accommodation has been felt. Shortly before the outbreak of the war the Swiss railways were seriously considering the abolition of the first class.

#### Storm Damage

Rainstorms on August 7 caused widespread floods which swept away railway bridges and blocked lines with landslides. The Gotthard Line was cut in four places, stopping all traffic between Biasca and Lugano and necessitating diversion of through traffic via the Simplon route. Osogna-Cresciano Station, north of Bellinzona, was flooded.

The bridge at Ponte Brolla, near Locarno, was swept nearly 200 ft. from its foundations. In the Engadine near Samaden, a steel bridge carrying the Bernina Railway was washed away.

#### Higher Rates and Fares

M. Josef Escher, Minister of Railways & Posts, recently hinted at possible increases in rates and fares on the Federal Railways, adding that it was necessary to have the courage for this "unpopular measure," as it would otherwise be impossible to augment railway receipts. Subsequently this statement was modified, with emphasis on the fact that there

#### Traction at 50 Cycles in France



Co-Co locomotive at La Roche sur Foron, French National Railways, on the line from Aix-les-Bains electrified at 20,000 volts

Photo]

[Notre Métier

was no question of a general increase; only certain freight rates were to be increased, with passenger fares left unchanged.

The Federal Railways acts have been examined, with the aim of greater financial autonomy for the railways. A report has also been submitted by the General Management of the Federal Railways concerning efforts made to further rail and road co-ordination.

## AUSTRIA

### Electrification Progress

Electric traction on the Vienna - Linz - Salzburg main line was extended from Linz eastward as far as Amstetten, 39½ miles, by the end of July. The conver-

sion is now being pressed forward of the last remaining steam-worked section between Vienna and Amstetten, 78½ miles, which it is hoped will be completed within 1952. This will mean the completion of the conversion of the whole main line between Vienna in the east and Bregenz in the west, 478 miles.

The conversion of the remaining main lines in British-occupied Carinthia has begun; work is in progress on the 17½-mile Villach - Tarvisio line connecting at Tarvisio with the Italian State Railways electrified main line to Udine. The 23-mile Villach - Spittal-Millstättersee link is to follow. Once these two conversions are completed the whole south-north route between Tarvisio and Salz-

burg, including the famous Tauernbahn between Spittal-Millstättersee and Schwarzach-St. Veit (the junction with the Salzburg - Innsbruck main line), will be electrified.

## IRELAND

### G.N.R.(I.) Rates Increase

The G.N.R.(I.) has applied to the Minister for Industry & Commerce in Dublin to increase passenger fares by 12½ per cent. and freight charges by 16½ per cent. The increases, which will apply in the Republic of Ireland and to cross-border rates and fares, will offset recent increases made in salaries and wages and increasing running costs generally.

## Publications Received

*A Project is Established:* the Indian Railways Locomotive Manufacturing Workshops, Chittaranjan: an illustrated booklet produced by the Public Relations Officer, Calcutta Railways, 20 pp. 9 in. x 7 in. Paper cover.—This is a well-produced and well-illustrated review of the production aims, history and site of the factory and colony at Chittaranjan, now developing rapidly.

The layout of the shops is described in detail, and there are brief notes on the township being built for the employees, and on the water and power supplies, manpower outlook, production plan, and on the progress so far made. The assembly shop is well over ½-mile long, and the offices and covered area of all the shops occupy over 1,000,000 sq. ft. Clear plans are included of the whole site including the township and of the shops, but it is a pity that individual groups of important buildings and shops are not labelled. There is also a map showing the position of the project relative to the coalfields, steelworks, and to Calcutta. The last page is devoted to the outlay involved, £11,250,000 in all. The principal contributory items are: workshops and their equipment and offices, £4,000,000; staff colony, £3,500,000; general charges, £1,500,000; electrification, nearly £1,000,000; land about £500,000; and staff amenities, nearly £250,000.

*The Locomotives of the Great Western Railway, Part I: Preliminary Survey.* Published by the Railway Correspondence & Travel Society, and obtainable from the Honorary Publications Officer, 18, Holland Avenue, Cheam, Surrey. 84 in. x 64 in. 62 pp. + 27 pp. plates. Illustrated. Stiff paper covers. Price 10s. (post free).—This book is intended to be the first of a series covering all the locomotives owned by the former Great Western Railway, but it forms a complete work for those who require only an outline of the subject. A short review of the broad-gauge engines is followed by a chronological survey of the standard-gauge types, supplemented by works lists from

Swindon and Wolverhampton giving the type, lot number (and G.W.R. number where applicable), and building date of every locomotive. Separate sections are devoted to locomotive liveries, standard boilers and fittings, power groups, and automatic train control. There are over 80 half-tone illustrations of early and modern locomotives, and the frontispiece depicts a 0-6-0 goods engine in Wolverhampton green livery.

*Iron & Steel Federation Statistical Yearbook for 1950, Part I.*—London: British Iron & Steel Federation, Tothill Street, S.W.1. 10 in. x 8 in. 128 pp. Price 7s. 6d.—This gives full information on the British iron and steel industry in all its aspects. Besides iron and steel production, finished steel deliveries and the use of raw materials, there are tables of imports and exports, prices, stocks, and employment in the industry, grouped by subject, ranging from iron ore to overseas trade statistics. Two summary tables give information for a long run of years: the first contains the main statistics of iron ore, coke, pig iron, scrap and steel; and the second sums up the information on the supply and disposal of steel. The Federation has also published Part II of its *Statistical Yearbook for 1949*, price 15s. This embodies statistics for all the steel-producing and the most important steel-consuming countries in the world, with tables of world production of iron ore, pig iron, and steel by country over a long period.

*Vulcan Locomotives.*—Two illustrated booklets in English, Spanish, Portuguese, and Afrikaans have been published by the Vulcan Foundry Limited. One of these deals with steam locomotives for freight and passenger services, and includes illustrations of various designs, as well as tables of principal dimensions and other particulars. The second booklet deals with electric, diesel-electric, and diesel-mechanical units for passenger, freight, and shunting services, built in conjunction with the English Electric Co. Ltd., the Metropolitan-Vickers Electrical Co. Ltd., and the Drewry Car Co. Ltd. The designs illustrated in this booklet in-

clude locomotives of 3,000 h.p., 2,600 h.p., 1,600 h.p. and 600 h.p. for freight and other passenger services, together with shunting locomotives of 300 h.p., 275 h.p., and 153 h.p., and a 275 h.p. diesel-mechanical railcar.

*Silvertown Mechanical Lubricators.*—Working instructions and maintenance methods are among subjects dealt with in an illustrated booklet on the Silvertown mechanical lubricator, published by Gulf Oil (Great Britain) Limited, Minoco Wharf, West Silvertown, London, E.16. Designed specifically for use on locomotives, this lubricator is manufactured by Gresham & Craven Limited. A diagram showing a typical layout for the lubrication of axleboxes is included as well as a diagram of the lubricating system for the supply of atomised lubricating oil to the cylinders. Section drawings of the Mark II and Mark III lubricators, with parts numbers to facilitate the ordering of spares, are included. Diagrams of the various control and check valves are similarly numbered. Calculations to give a fixed amount of oil for 100 miles and efficiency list figures are also given.

*Engineering Training Scheme for Apprentices.*—An illustrated leaflet outlining schemes for training apprentices and boys has been published by Ransomes & Rapier Limited. Practical training is given by this firm in the various departments of the works, and technical training also is provided. Trainees can qualify for an indentured trade apprenticeship, and post-graduate courses comprising practical training are also available.

*British Railways Tours in Scotland.*—The Scottish Region of British Railways has issued a handy pocket booklet of nearly 200 pages containing suggestions for exploring Scotland with circular tour tickets. In addition to featuring various day tours operated from principal centres details are also given of the longer tours run this year in the West Highlands and North of Scotland. Route maps and descriptive notes and information on luggage-in-advance arrangements contribute to the value of the book.





## Testing a 40-ft. Pre-Stressed Concrete Bridge Span

*Design and construction of the span, with a description of equipment used, together with the conclusions reached*

**I**N our issue of July 6 there appeared a brief summary of the investigations carried out by the Research Section of the Central Standards Office of the Indian Railway Board regarding the behaviour of a 40-ft. pre-stressed concrete bridge span under 5 ft. 6 in. gauge "main-line" loading. We have now received from the Railway Board the full text of the 40-page report on this subject. It describes the design and construction of the span, as well as the results of the tests to which it was subjected, as expressed by the conclusions arrived at in the report.

The tests were carried out to ascertain some of the unknown factors in such a pre-stressed structure and included (1) the extent of the loss, progressive or fixed, in the compressive force induced by pre-stressing; the creep in the pre-stressing wires in course of time; (3) the friction at points where the direction of the wires is changed; (4) the amount of pre-stress lost due to the wires slipping at the end anchorages when the external stretching force is relaxed; and (5) the loss incurred when all wires are not stretched simultaneously.

It was recognised, however, that to establish the permanence of pre-stressing and to estimate the losses over a long period, it would be necessary to measure the pre-stressing force in the wires and the induced compressive stress in the concrete over a period of years. The design of the span can be seen from the illustrations; its weight, complete with bracings, is 46 tons.

An advantage claimed for a pre-stressed concrete girder or beam is that it can be pre-cast and made in any number of small sections or lengths, easily erected, and then pre-stressed after threading the cables through each section. Each main girder was therefore made in three 14 ft. 8 in. sections and nominal reinforcement was provided to prevent cracking during the handling and transport of the sections. The girder bearings are of mild-steel plate.

On this test span the track rails were bolted directly to the girder flanges and cushioned with 2 in. timber packings in place of the normal cross-sleepers. The space between the girders was spanned by 3 in. reinforced concrete slabs resting on the recesses in the top flanges. These slabs are removable for inspection of the girders.

It will be noticed that top and bottom cross-bracings and solid diaphragms were provided at each joint and over the bearings. The web was thickened at each diaphragm to the same dimension as the flange. The design provided for pre-stressing the top and bottom bracings at right angles to the span after the girders had been assembled in final position. There are eleven pre-

stressing cables in each main girder, of which ten are in the bottom flange in two rows of five each; the eleventh is 1.2 ft. above the girder centre line. Each cable consists of 12 0.2 in. dia. wires arranged round the circumference of a  $\frac{1}{2}$  in. dia. core composed of 14-gauge elongated spiral wire. The spiral core is placed at regular intervals. The cables are anchored into the concrete by special cones at each end of the girder only, and the wires are not bonded into the concrete anywhere else.

### The Pre-Stressing Wires

The design is based on a working stress of 50 tons per sq. in. in the wires, which were tested and proved to have a yield point of 62.8 and an ultimate strength of 93.7 tons per sq. in., and an elongation of 9.3 per cent. Chemical analysis showed the following percentages: carbon 0.72, manganese 0.61, sulphur 0.052, and phosphorus 0.023. The actual pre-stressing force in the cable is calculated to be 22.15 tons.

Due to some slipping of the wires at the anchorages when the stretching force was relaxed, there was slight loss in pre-stressing force, but no allowance was made for this loss in the design. As each cable was pre-stressed, the pre-stressing in those previously pre-stressed was correspondingly reduced, and the pre-stressing force in the cables was therefore increased to allow for this loss. Also, to compensate for creep in the wires, which reduces that force, they were first over-stretched by applying a 10 per cent. overload, relaxing the wires, and restretching them again for final pre-stressing.

The permissible compressive stress in the concrete was taken as 1,500 lb. per sq. in. and the minimum cylinder strength was specified as 3,600 lb. per sq. in., at 28 days. In the design no tensile stress was allowed in the concrete under either dead-load or full-live load including impact.

The construction of the test span was carried out by a contractor. The girders were cast on a 2-in. concrete base covered with oiled paper and the shuttering was of teak planking lined with sheet metal. Both external and internal electric vibrators were used. To provide the holes for the pre-stressing cables temporary  $1\frac{1}{2}$  in. cables wrapped round with small-gauge zinc sheet were fixed in the shuttering. When the concrete had set, the spiral core of the temporary cables was pulled out and the wires removed, leaving the zinc sheet in place as tubes. No difficulty was experienced in inserting the pre-stressing cables through them.

Openings were provided in the girders during concreting for fixing electric resistance strain gauges on the pre-stressing wires and on the nominal reinforcement bars. The outer anchorage

cones were placed in position during concreting for both the main pre-stressing cables and those in the bracings. They were therefore in place before the cables were stretched, and the friction between the outer cone and the surrounding concrete assisted in resisting the force on the anchorage.

The joints in the main girders were designed to be straight within the depth of the top and bottom flanges where the compressive stresses are high. Theoretically, an all-straight joint should suffice, but it was considered advisable to design the joint as the drawing shows, and so provide a greater factor of safety. The second section of each girder was concreted in continuation of, and in line with, the already-set first section, using the end of the latter for the beginning of the second section to ensure that the joints mated correctly. Oiled paper was used to prevent adhesion between the two sections. After the second section had set, it was separated from the first and the paper removed.

The temporary cables in the shuttering were supported by 1 in. dia. pipe spacers held in place by bolts passing through them and the sides of the shuttering: the bolts were subsequently withdrawn, leaving the spacers in the concrete.

The results of concrete compression tests on the day of pre-stressing showed the following strengths of the test cylinder in lb. per sq. in.

No. of days after concreting	53	49	44	37	34	31
Strength of test cylinder	4,360	4,200	3,800	4,430	4,520	4,750

The tests were made with a 200-ton hydraulic testing machine.

### Electric Resistance Strain Gauges

Electric resistance strain gauges were fixed on pre-stressing cables (a), (c), and (f), on the nominal reinforcement bars in the flanges, and at the joint and grillage reinforcement at the back of the anchorage cones in identical positions in both girders. Although elaborate precautions were taken, it was not possible to ensure that the whole width of every gauge was in proper contact with the wire, the size of which was so small. The gauges on the wires were therefore calibrated by fixing Huggenberger tensometers on the same wires and stretching the wires with pre-stressing jacks.

To compensate for changes of temperature, dummy electric resistance gauges were fixed on identical pieces of wire or bar, near the active gauges. For recording stresses during pre-stressing, the absolute resistances of both active

and dummy gauges were measured by means of a Wheatstone Bridge, through a post-office box and a sensitive galvanometer. The difference between the absolute resistances of the active and dummy gauges at any instant was a measure, therefore, of the absolute change of resistance and, therefore, strain.

The upward deflection of the girders during pre-stressing was measured with dial gauges fixed on temporary masonry pillars and kept under initial compression. During the live-load tests the deflection was measured with a bell-crank lever with one end resting against the bottom of the girder and the other against a flat nicrome strip. As deflection caused the lever to rotate, the position of contact on the nicrome strip

the release, in order to ascertain the stress lost due to wire-slipping in the anchorage.

#### Erection and Testing of Span

The girders were erected with two 18-ton hand cranes, which also placed in position between the girders the bracings and diaphragms, precast as one unit; the bracings then rested on packings. The pre-stressing cables were next inserted, stretched, and anchored. It was found that, as a result of slight movement in the shuttering during concreting, the girders were not in absolutely true alignment. Consequently, it was impossible to avoid a  $\frac{1}{4}$  in. wide gauge in the track.

The heaviest available 5 ft. 6 in. gauge locomotive with a 22½-ton axle-

hours. These gauges, which are of type A-14, cannot be relied on to record the loss of pre-stress over a long period," to quote the summary of the report. It was found that the differences in stress between (b) and (d) were in some cases great increases and in others considerable decreases, and, in one case, the stress disappeared altogether in (d).

These variations were not due to any change of load on the girder, as the dead-load was applied during pre-stressing, and the live load was removed prior to the final stress reading. Variation between the stresses computed from the measured extension of the wires and those recorded by the electric strain gauges were also great and were similarly caused by the erratic gauge behaviour.

Loss of pre-stress due to slip of the wires in the anchorages when the jacks were released, was undoubtedly considerable, and could not be neglected, but its exact extent could not be correctly assessed because the gauges gave such erratic results. However, the average works out at 6.7 tons per sq. in., and allowance for this will be made in future design.

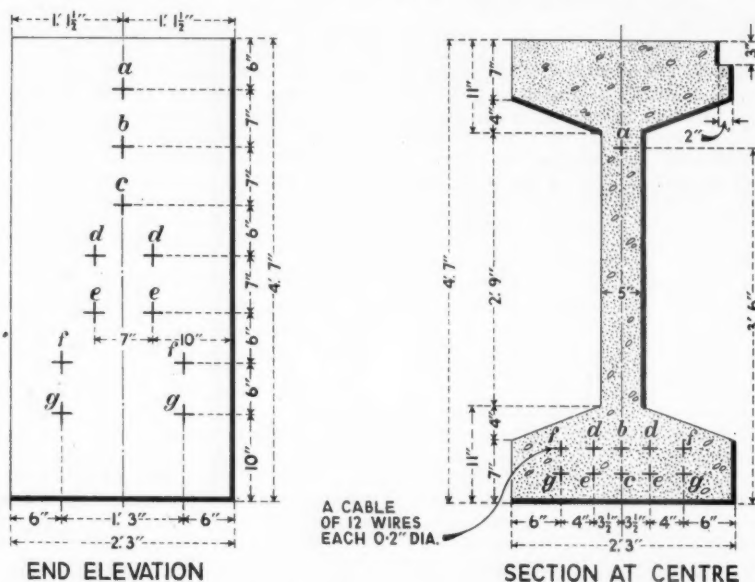
The percentage increments in stress due to impact resulting from an equivalent wheel peripheral speed of 45 m.p.h. were: in cable (a) 16 per cent.; in cable (c) 30 per cent.; and in cable (f) 61 per cent. The recorded static deflection was 0.20 in., and that under slipping 0.26 in., so that the impact increment measured by deflection was 30 per cent. The theoretical impact increment for a 42.15 ft. span is 56 per cent., or 45 per cent. neglecting track effect. As there were no rail joints on the test span, it could be neglected in this instance. The recorded upward deflection was 0.14 in., as compared with the corresponding theoretical figure during pre-stressing, after allowing for the effect of dead load, of 0.16 in.

#### Conclusions

The performance of the test span under dynamic loading equivalent to 18 per cent. over the design load was considered to be entirely satisfactory. The fact that the measured deflections were slightly lower than the theoretical values was due to the effect of the thickening of the webs at the joints, to the existence of the bracings, and to the track rails. The effect of friction between the concrete and the pre-stressing cables—where the direction of the cables is changed—in altering the stress in the cables appears to be negligible. The magnitude of stress lost in the wires due to the slipping of the wires in the anchorages was 6 to 7 tons per sq. in., and may not be ignored in a span of this length.

It is not possible to ensure correct track gauge or cross-levels if the rails are fixed directly on to the main girders. Cross-sleepers should invariably be provided for this type of span. For the satisfactory performance of pre-stressed concrete girders, good workmanship, and strict supervision are essential.

(Continued on page 182)



End elevation and section of girder for testing

altered, causing a change in the resistance and the movement to be recorded electrically.

Before pre-stressing began, the absolute resistance of all active and dummy strain gauges was measured and recorded, and the reading of the deflection dial gauge was noted. Cable (a) was pre-stressed first, followed by cables (g), and then progressively upwards. Before inserting the inner cones the cables were kept under an overload of 10 per cent. for 2 min. to reduce the creep in the steel. When each cable was stretched, its extension at both ends of the girder was carefully measured, and the jacks were worked until the sum of the extensions was equal to the calculated value required for that cable; the values varied from 22.3 tons in cable (c) to 25.8 tons in cable (g).

The inner cones were then driven in by means of the subsidiary plunger of the hydraulic jack, and the jack was finally released. The strain-gauge resistance was measured before and after

load, an "AWE" was used for the live-load tests, and this produced a dynamic loading 18 per cent. higher than the design load. As previously explained, speed tests were not possible; instead, the rails on the span were greased and the engine was made to slip at the maximum possible speed with fully-opened regulator. The increment of stress in the wires and reinforcing rods was only measured with the locomotive moving at slow speed and again when slipping, and the results were recorded on a photographic film by means of oscillograph equipment.

Stresses were therefore recorded at four stages: (a) when each cable was fully stretched and before the jacks were released; (b) after the cable was anchored and the jacks were released; (c) after completion of pre-stressing; and (d) after the span had been subjected to and released from the live load. Unfortunately, the behaviour of the strain gauges "was found to be very erratic when the interval between measurement exceeded more than a few

## Announcing Train Arrivals at Euston

*Projection of slides on screen in waiting hall of train arrival bureau*



*Exterior of arrival bureau, showing canopy over non-reflecting window giving view of screen in waiting hall*

THE train indicating apparatus in the new train arrival bureau at Euston, London Midland Region, which was opened on June 18 and briefly described in our June 22 issue, consists of a projector throwing train information by means of a slide on to a panel in the waiting hall, in addition to the public address and necessary telecommunication equipment.

Information on the progress of Euston-bound passenger trains at Crewe, Rugby, Tring, and Watford is received at Willesden Telegraph Office, whence it is relayed to the projector operator in the Euston train arrival bureau by means of a teleprinter circuit. To permit confirmation of messages when necessary and cover possible teleprinter failures, the arrival bureau is connected to the Willesden-Euston train reporting telephone circuit. Particulars of platform arrangements are given to the bureau by the signaller in Euston No. 1 Box, with which telephone contact is available. Telephone connections are also provided to the Euston automatic exchange, the Telephone Enquiry Bureau, and the station train announcer.

All the telephone circuits are concentrated on a keyboard, with lamp calling, in the operator's room, and a duplicate keyboard in the centre of the row of projectors, so as to reduce to a minimum the amount of walking when making or answering calls.

### Public Address System

Loudspeakers are provided at the ends of platforms 1, 2, 3, and 6, inside the train arrival bureau, and under the canopy so as to enable the operator to make announcements regarding the

arrival of trains, and to establish contact when desired with individuals or parties arriving by a train. The microphone and circuit selecting keys are in the operator's room, and the amplifier is accommodated in the basement with the telephone relay cabinet, batteries, and charging equipment.

As both the station train announcer and the projector operator are able to make announcements on platform 6, and the area surrounding the ends of

platforms 4 and 5, warning lamps are fitted to both announcers' selection panels to indicate those conditions in which announcements may conflict.

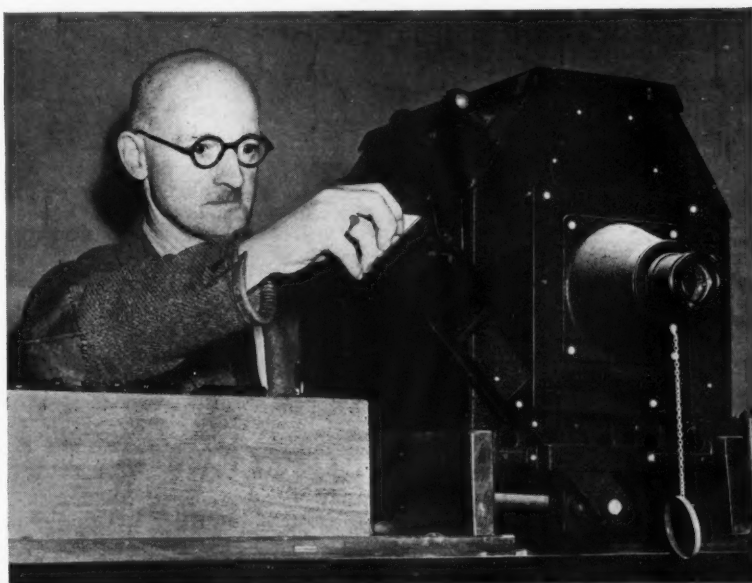
Electric impulse clocks driven from the master clock on the station are provided inside the waiting room, the enquiry office, the operator's room, and near the projectors.

### Projector and Screen

The indicator is fundamentally a projector. The source of light is a 1,000-W. projection bulb under-run by 17 per cent. to give an average life of 300 hr. To minimise failure, alternative sources of electricity are installed.

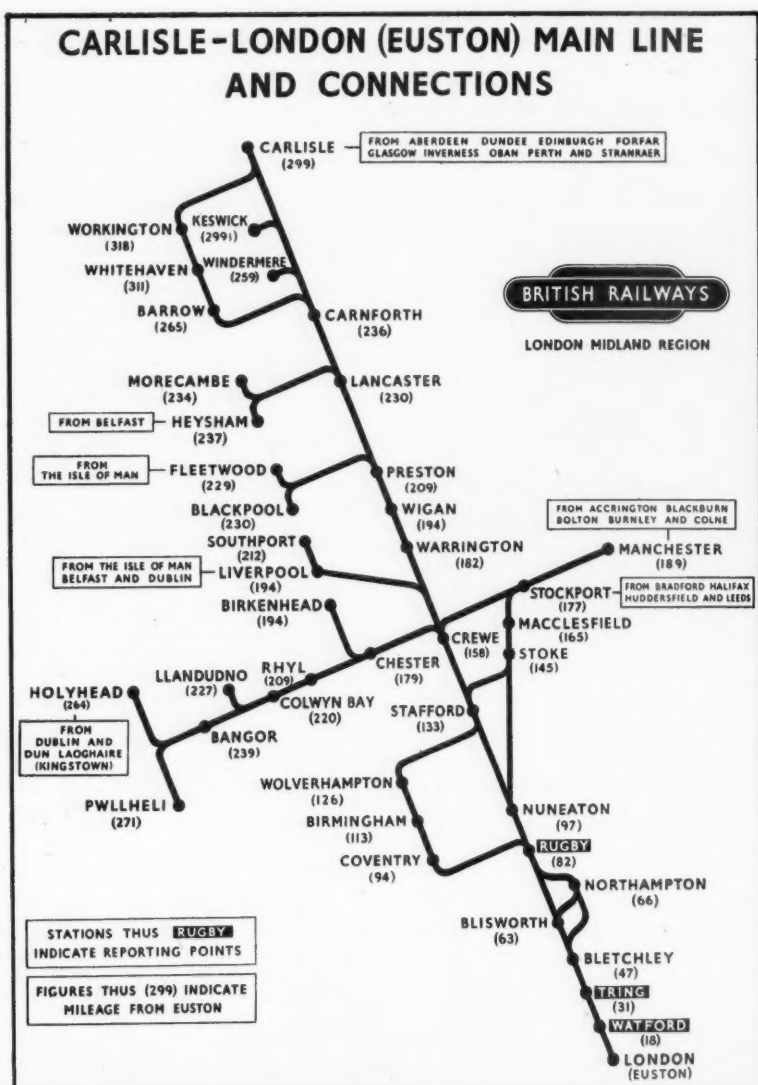
The screen on which the announcement is displayed in the waiting hall consists of a sheet of glass acid-etched on one side, about 5 ft. 3 in. x 2 ft. 6 in.; the height of the smallest letter is 2 in.

The slide or negative inserted in the projector consists of a piece of transparent plastic with a black surface through which the letters are engraved. The slides are made so that it is impossible to insert them upside down or in reverse. The projector and lens are adapted from a standard projector manufactured by Ross Limited. The method of building up the display is to take ready-prepared slides from cabinets close at hand, and insert these in the projector; when particulars of "minutes late" and "arrival platform" are received, the blank parts of the slide are removed and the slide giving this information inserted.



*Projector, showing slide with blank portion, which can be replaced as train announcement is completed*





Twelve panels are installed and any one of these may be used for special trains and notices not covered by the ready-made slides. The method of display is by a specially prepared slide on which the inscription is engraved by hand. The display is easily legible at 50 ft., even when the waiting hall of the arrival bureau is illuminated to 10 foot-candles, which is the standard lighting needed in the room.

#### Advantages of New Device

Compared with roller blind or other mechanical methods, the following advantages are claimed: (a) the initial cost is considerably less, the cost of the installation being about £1,000; (b) the display is much more legible; (c) alterations and new indications are readily effected at low cost; (d) there are no moving parts to get out of adjustment; (e) special notices are quickly made; and (f) maintenance costs are very low.

The estimated cost of operating the twelve-panel installation is approximately £250 per annum for electricity, £90 for bulbs, and £20 for slides. The life of the apparatus will not be less than 20-25 years.

The device has been designed by Mr. J. M. Harrison, Architect of the L.M.R., in consultation with Ross Limited.

*Diagrammatic map of L.M.R. Western Division main line and connections, flanking indicator screen*

#### Testing a 40-ft. Pre-Stressed Concrete Bridge Span

(Concluded from page 180)

Fabrication under controlled conditions in a central concrete depot is desirable. Both internal and external vibrators are necessary. Comment on the behaviour of the electric strain gauges has been quoted already.

The summary in the report concludes by mentioning that the test span was to be installed in a branch line, so that its behaviour in actual service over a long period could be noted. When more reliable strain gauges became available, it was proposed to fix them on the pre-stressing wires, and periodically to record the change in stress, in order to ascertain the progressive losses, if any, in pre-stressing.

It may be mentioned that the report of the Railway Board has five appen-

dices in addition to the drawings, two of which are reproduced. They are largely tabular, and give details of such matters as the calculations for the initial pre-stressing force applied to the cables, the calibration factors for the gauges on the wires, the absolute resistance of both active and dummy gauges and the stresses recorded after the completion of each distinct stage, and, finally, the calibration factors for the stress and those actually recorded under live load.

**BRITISH STANDARD FOR SCREW THREADS.**—There are now two classes of fit for B.A. screw threads, sizes 0 B.A. to 10 B.A., and to facilitate the economic production of small commercial bolts, screws, and nuts a revision (B.S. 93:1951) of the 1919 edition provides a "normal" series having increased bolt and nut tolerances for sizes 0 B.A. to 16 B.A., affording an allowance between the maximum bolt and

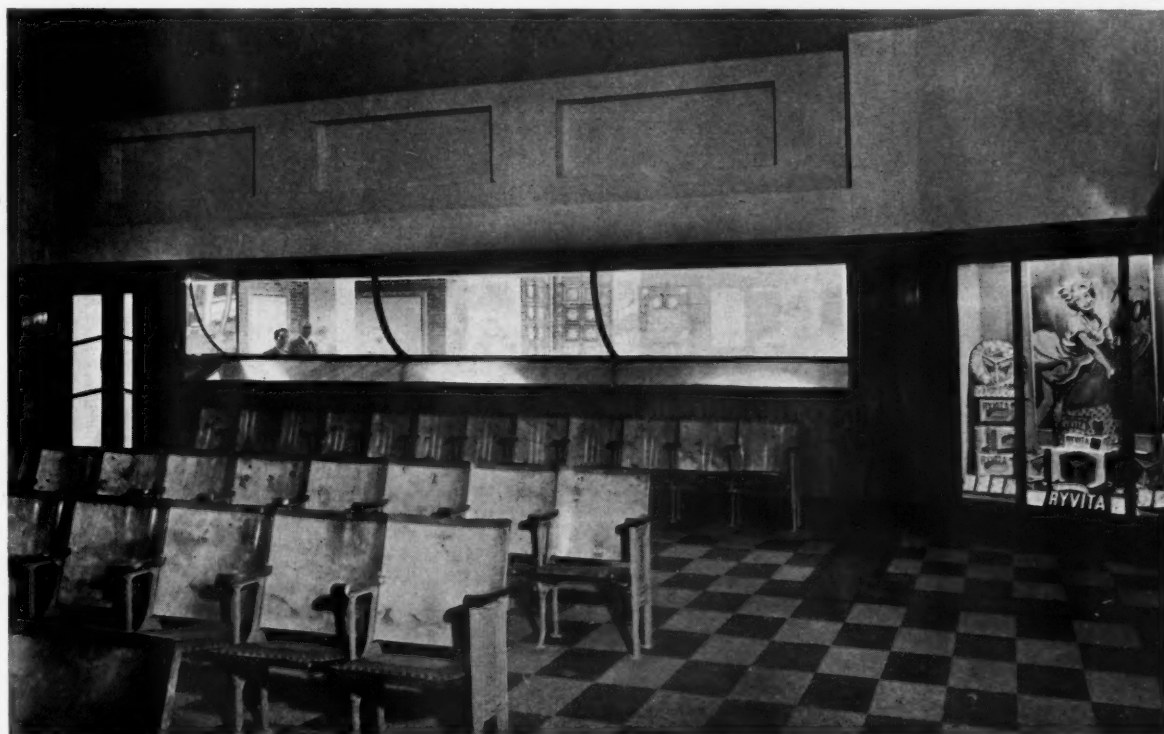
minimum nut sizes. The specification also includes a recommended gauging system and a memorandum has been prepared explaining the relationship between existing gauges made to comply with the limits specified in B.S. 93 and the War Emergency Amendment of 1940. Copies of the memorandum may be obtained from the British Standards Institution, Sales Department, 24, Victoria Street, London, S.W.1, Price 3s.

**DESIGN POLICY IN INDUSTRY.**—The first international discussion by industrialists of their design policies will take place at the Royal College of Art in London on September 19 and 20 as an official event of the Festival of Britain. This congress will be attended by about 250 guests, mainly directors and chief executives of firms in Britain, Europe and the U.S.A., and they will discuss "Design Policy in Industry as a Responsibility of High-Level Management." The congress has been planned by the Council of Industrial Design.

## Announcing Train Arrivals at Euston



*Indicator screen in waiting hall, showing partially built-up display awaiting platform and "minutes late" advices; panels for railway posters and showcases are located on right of diagrammatic map*



*Rear wall of waiting hall, showing non-reflecting window affording view of indicator screen and (through window) pillars of canopy shelter, also (on right) showcase for commercial displays*

## Rail-Road Semi-Trailers in France

*Door-to-door service, making best use of both rail and road facilities*

*By Monsieur E. Bidet, French National Railways Commercial Service*



*Trailer being conveyed by road*

ONE of the methods adopted by the French National Railways to provide door-to-door transport and offer customers advantages comparable with those of road transport, is the rail-road semi-trailer. Those at present in service have been built by the Société pour l'Union des Transports Ferroviaires et Routiers (U.F.R.).

When running on the road, the

U.F.R. vehicle is like an ordinary semi-trailer; it may be hauled behind any type of tractor which has the U.F.R.-type couplers. The carrying wheels of the semi-trailer are provided with supplementary flanged rims, and the auxiliary wheels mounted on suspension springs also have flanged wheels.

For its journey by rail, the trailer runs on to a special wagon, fitted with

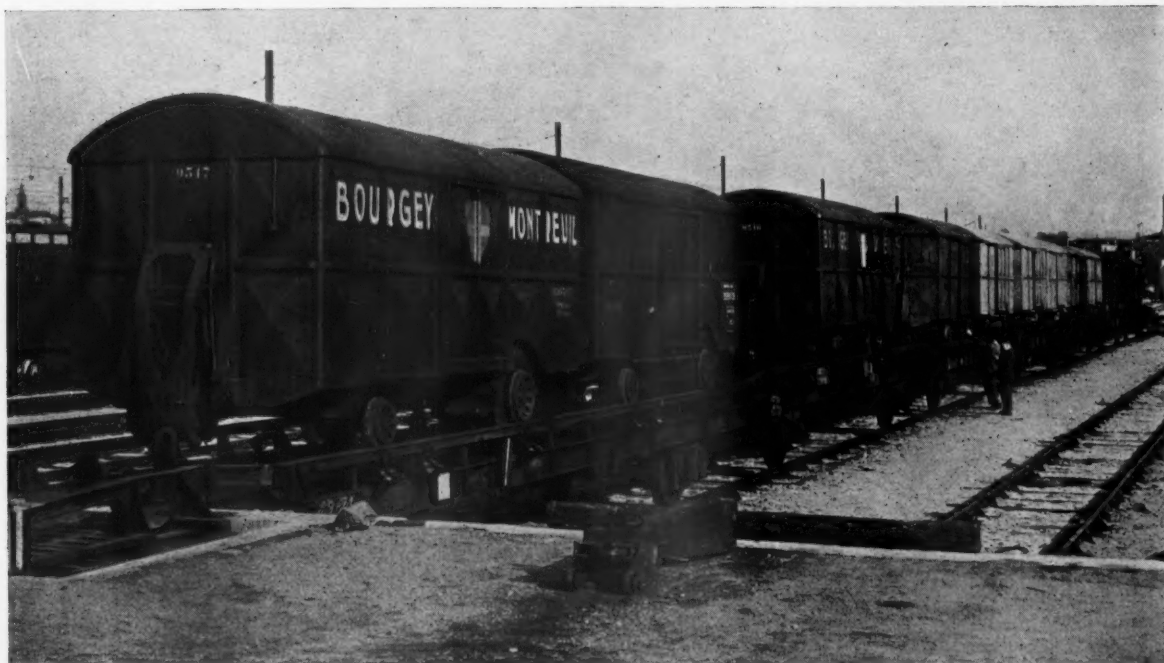
two carrying rails, by means of flanged hubs projecting outside its rear, pneumatic-tyre, road wheels and the two small flanged wheels in front. The trailer is then lifted a little so as not to rest on the tyres. The trailer is fixed to the rails on the wagon by clamps specially profiled to lessen shocks from buffing and shunting. The trailers may be built with all types of bodywork including fixed roof or open roof van; refrigerator van, or tank.

Although the first results of the U.F.R. undertaking were achieved in 1935, only after 1941 did trials of the trailer in ordinary service begin. Development was held up by the war and by immediate post-war events in practice, it was not until 1946 that U.F.R. semi-trailer had its real test.

### Growth of Fleet

With a fleet of 650 trailers in service, the total tonnage conveyed in 1950 was 206,000 tonnes. After the completion of new vehicles, the fleet in service will be 750; it will soon reach 850 units. All belong to private undertakings, mostly traders who have agreed with the S.N.C.F. to use the vehicles on the road only on station to door service.

The traffic handled by the trailers includes specially fragile loads needing solid packing and for which handling is to be avoided, such as plate glass;



*Trailers loaded on special wagons for carriage by rail*



glassware; electrical appliances; footwear; paper and cardboard; wine; industrial liquids; meat; and dairy products.

The use of the rail-road trailer, which is particularly suited to the door-to-door service of goods sent in sufficient quantities to occupy much of the capacity of the vehicle, yields most interesting results. It has been found notably that for goods such as plate glass and eggs, rarely carried in ordinary wagons without damage, absolute security is obtained when they are carried by rail-road trailer.

The results obtained show that the rail-road trailer is a rational method of door-to-door goods transport, thanks to its combination of the special qualities and advantages which are offered by

both the railway and road. It also allows traders to preserve their commercial individuality and carry on their business, giving the same service to their customers and exchanging the risks of long-distance road haulage for the regularity and safety of the railway on long journeys.

The present organisation also enables transport by trailer to be undertaken in conditions of speed which compare in all respects with those of road transport, and therefore allows the maximum user of the vehicles. For example, a rail-road trailer loaded on to wagon at Bordeaux on day 1 may reach the consignee in Paris on day 2.

Although, from the railway viewpoint, the rail-road trailer requires the use of

special equipment, this drawback is largely compensated by the full use which may be made of such equipment; the average annual return from a special trailer-transporter wagon is 280,000 tonne-km., or more than twice that of the ordinary S.N.C.F. rolling stock.

The rail-road trailer therefore satisfies the generally-accepted principles of transport co-ordination, which consists in entrusting to the railway the long-distance hauls and to the road the short journeys necessary to serve the premises of consignor and consignee.

It is therefore, rather than a weapon against long-distance road transport, a practical means of co-ordination between road-rail, closely allying the interests of both.



*Trials at Ivry Yard, near Paris, of the running of trailers on and off railway wagons*

**WAGON REPAIRS LIMITED.**—Sir Leslie Boyce, Chairman of Wagon Repairs Limited, said at the recent annual general meeting that the profit for the year ended March 31, 1951, after making provision for depreciation and taxation, amounted to £133,273. The profit of the parent company was £111,810, to which was added £14,776 net dividends from subsidiary companies, making the balance available £126,586. Since October 1, 1949, the wagon repairing industry had, under pressure, reduced its charges for repairs to railway wagons owned by the British Transport Commission. The effect of the reduction, which had operated throughout the full financial year to March 31, 1951, coupled with the increase in labour and material costs, had been to reduce the margin of profit on work done for the railways to a level which did not provide sufficient scope for replacement of wasting assets and a

satisfactory return on the increased capital employed in the business. The demand for their services in the repairing of railway wagons had not diminished and their repairing facilities had been employed to full capacity throughout the year.

**SCOTTISH MACHINE TOOL CORPORATION.**—Mr. Douglas Sharp, Chairman, at the annual meeting of the Scottish Machine Tool Corporation on August 3, said that the accounts showed a profit, subject to taxation, of £113,334, as compared with £96,682 for the previous year. Taxation required £74,000, which was £12,000 more, and this left a balance of £39,334 as compared with £34,682. A provision of £10,000 had been made for the inauguration of a staff pension scheme. An interim dividend of 3 per cent., less tax, had already been paid and the directors now recommended in addition to the usual

final dividend of 5 per cent. a bonus of 2 per cent., less tax, making a total distribution of 10 per cent. for the year. The balance remaining to be carried forward in the profit and loss account amounted to £46,728, as compared with £48,694 for the previous year.

**NICKEL PRODUCTION HIGHER.**—At the annual meeting of the International Nickel Company of Canada Limited in April it was announced that by the end of the year the production of refined nickel would by this firm be increased by 1,000,000 lb. a month. As a result of intense effort at the Canadian plants in underground mining and metallurgical process this objective has already been achieved. This encouraging result brings total production to 21,000,000 lb. a month and makes it possible for world markets to obtain some additional refined nickel.

## A Six-Ton Mobile Crane

*Incorporating an inching device for accurate placing of loads*

**A**N addition to the mobile full-slewing cranes designed and manufactured by K. & L. Steelfounders & Engineers Limited is the six-ton mobile crane known as the Jones KL66. The crane is of the full-slewing type, and in common with the existing range of Jones KL mobile cranes, uses a direct mechanical transmission system with diesel prime mover. The four motions of hoisting, slewing, travelling, and derricking are independently operated and reversible.

The maximum load of six tons can be hoisted at speeds up to 40 ft. a min., and lighter loads up to two tons can be handled up to 120 ft. a min. For accurate placing of loads an inching device has been incorporated for either lifting or lowering, an operation carried out through the movement of a joystick type lever.

### Control and Mechanism

The controls are simple; three foot pedals are provided, one each for the engine clutch, travelling brake, and engine speed. A large diameter steering wheel is set at the optimum angle for easy manipulation, and when the superstructure is slewed to the rear of the crane, steering is automatically reversed to normal action. A weather-proof saloon cab is provided, having large safety-glass windows, and a cab heater can be fitted.

What is claimed to be a new feature is the application of unit construction to the various crane motions. Each motion has its own gearbox with enclosed bearings and gears with oil-bath lubrication, and semi-automatic brakes are provided for hoisting and derricking. To provide differential action without wheel spin while travelling a differential has been developed in conjunction with four-wheel drive.

Gradients of 1 in 8 can be negotiated by the crane travelling light, while a full load of six tons can be carried on level ground at speeds up to 3 m.p.h., or without loads, on level ground, at 6 m.p.h.; the crane can turn in a circle of 23 ft. radius. Travelling speed is operated by accelerator pedal and plate-clutch in conjunction with a three-speed gearbox. Brakes of Girling 2-leading shoe type are fitted on all four travelling wheels; a hand lever is provided for parking.

Pneumatic tyres are used on restrictor wheels slightly smaller in diameter than the tyres; which limits deflection of the tyres. They provide additional bearing area which prevents the cranes from sinking in soft ground, and protect the side walls of the tyres from damage when the crane is working in a confined area. In the event of a sudden blow-out the restrictor wheels take the weight at once.

The standard power unit is a Perkins

diesel engine of 37 b.h.p., fitted with maximum speed governor in addition to the variable speed control operated by the accelerator pedal in the driving cab. Electric self-starting is fitted, and thermostatic control of the cooling system keeps the engine at the correct running temperature whatever the climatic conditions. The engine is arranged as a completely self-contained unit.

wharf. Optional equipment includes an air-compressor for tyre inflation, equipment for working with single or double chain grabs, electric lighting, automatic safe load indicator, magnet equipment, and so on.

The general dimensions of the crane are as follow:—overall width, 8 ft.; overall height with jib lowered, 11 ft. 4 in.; tail radius, 6 ft. 3 in.; weight with 20-ft. standard jib, 13½ tons; stability



*Jones KL66 mobile crane fitted with restrictor wheels*

The crane can be supplied as a mobile unit on pneumatic-tyre restrictor wheels or on crawler chassis. It is also available as a lorry mounted crane, or on a railway chassis, or on a fixed base suitable for mounting on a platform or

margin on level ground, not less than 50 per cent.

The crane is distributed in Great Britain by George Cohen Sons & Co. Ltd., and is exported by K. & L. Steelfounders & Engineers Limited.

**TROLLEYBUS TRACTIVE RESISTANCE.**—The manufacturers of trolleybus electrical equipment who are members of the British Electrical & Allied Manufacturers Association have recently taken a useful step towards standardisation by obtaining a correct trolleybus tractive resistance curve. A comparison of the tractive resistance figures previously used by the different manufacturers in calculating vehicle performance revealed considerable divergence and it was found that very little test data on trolleybus tractive resistance was available. The first series of tests was

undertaken at Hastings on a two-axle double-deck trolleybus and the second series was carried out in London.

**EXCURSIONS FOR SEASIDE ILLUMINATIONS.**—For the illuminations at Blackpool, Morecambe, Seaham, and Whitley Bay the North Eastern Region this year will run 215 special trains. Of these, there will be 26 guaranteed and private trains and 65 excursions to Blackpool, six guaranteed and private trains and 91 excursions to Morecambe, 19 evening excursions to Seaham, and eight to Whitley Bay.

## RAILWAY NEWS SECTION

## PERSONAL

Mr. A. H. Murison, Assistant Civil Engineer, New Zealand Government Railways, has been appointed Chief Civil Engineer.

Mr. D. C. Woodward, General Manager, Nigerian Railway, is at present on leave in Great Britain. During his absence, Mr. E. J. B. Gahan, Chief Engineer, is acting as General Manager.

Mr. K. C. Bakhle, who, as recorded in our June 1 issue, has retired as Chief Commissioner of Railways, India, has now been appointed a Director of Tata Industries Limited and will be in charge of Air India.

The King, on July 31, at Buckingham Palace, conferred the honour of Knighthood on: Mr. David Anderson, LL.D., M.I.C.E., Senior Partner, Messrs. Mott, Hay & Anderson; Mr. Roger Duncalfe, Chairman, British Standards Institution; Mr. Bernard Guy Harrison, Chairman, Harrison & Sons Ltd., Member of Council, London Master Printers' Association; Mr. Reginald John Hodges, General Manager & Secretary, Mersey Docks & Harbour Board; Mr. Lionel Harold Harvey Lowe, F.C.A., Member of the National Coal Board; Mr. Henry Hugh William Warren, D.Sc., M.I.E.E., M.I.Mech.E., Managing Director, Associated Electrical Industries Limited; Mr. James Reid Young, Director, Vickers Limited, and Vickers-Armstrongs Limited.

Mr. T. J. Carton, District Superintendent, Dublin, Great Northern Railway (Ireland) has been appointed District Traffic Manager, Dublin.

Mr. S. C. Pearson, Head of Works Section, Commercial Superintendent's Office, North Eastern Region, York, has been appointed Assistant (Special Duties) in the Office of the Commercial Superintendent.

Mr. E. O. Hale is retiring as Maintenance Assistant to the Works Superintendent, Carriage & Wagon Works, Derby, London Midland Region, on August 31.

Mr. W. R. Herod has tendered his resignation as a Director of Associated Electrical Industries Limited.

The following notifications appeared recently in *The London Gazette* under the heading of Supplementary Reserve of Officers, Royal Engineers, Transportation Section:—

Major A. J. W. Stonebridge, A.M.I.C.E., resigns his commission January 25, 1951, and is granted the honorary rank of Major.

Captain H. R. A. Chamberlain resigns his commission September 25, 1950, and is granted the honorary rank of Captain.

Mr. Richard Miles has been appointed Press Officer of the newly formed Ministry of Materials.

Mr. J. A. J. Blanckensee and Miss E. P. Wood (Joint General Managers of the Raw Materials Division of George Cohen Sons & Co. Ltd) have been elected to the boards of Pollock Brown & Co. Ltd., Westbourne Park Coal & Iron Co. Ltd., and Southall and Hayes Coal & Iron Co. Ltd.

Mr. C. E. Baird, General Manager, Tasmania Government Railways, who, as recorded in our June 1 issue, has been appointed Commissioner of Transport for Tasmania, joined the Railways Department as a licensed surveyor in 1928 and became Resident Engineer at Launceston in 1934. He was Assistant Engineer (Civil) to the Chief Engineer from 1936 to 1940. During the war he served in the Army, holding the rank of Lt.-Colonel in command of the Royal Australian Engineers, 6th Division; he was awarded the O.B.E.

Mr. T. W. Ratcliffe, Works Accountant, Earlestown, London Midland Region, who, as recorded in our August 10 issue, has been appointed Works Accountant, Gorton, Eastern Region, entered the service of the former Midland Railway in the Locomotive Accountant's Office, Derby, in 1912. He saw active service with the Signals Branch, R.N.V.R., from 1916 to 1919, when he returned to his former office. In 1927 he became Head of a new costing sub-section, formed to deal with individual costing of locomotive repairs and kindred subjects



Mr. C. E. Baird

Appointed Commissioner of Transport for Tasmania

for services in New Guinea. In 1946 he became Chief Civil Engineer of the Tasmania Government Railway and was appointed General Manager in September, 1947. Mr. Baird holds the degree of Bachelor of Engineering of the University of Tasmania, and is in addition an Associate Member of the Institute of Engineers (Aust.)

#### BRITISH INTERNAL COMBUSTION ENGINE RESEARCH ASSOCIATION

At the recent annual general meeting, Viscount Falmouth, M.I.Mech.E., Companion I.E.E., was re-elected President of the Association for 1951-52.

Air Commodore F. R. Banks, C.B., O.B.E., Dr. S. F. Dorey, C.B.E., F.R.S., Sir Lynden Macassey, K.B.E., K.C., Vice-Admiral (E) The Hon. D. C. Maxwell, C.B., C.B.E., and Lieutenant-General Sir Frederick G. Wisberg, K.B.E., were re-elected Vice-Presidents. The Director-General, Fighting Vehicles Division, Ministry of Supply, Major-General H. E. Pyman, C.B., C.B.E., D.S.O., was also elected a Vice-President.

Mr. H. B. V. Teague, of Crossley Brothers Limited, has succeeded Mr. J. Jones as Chairman of Council.

and in 1931 the individual costing of repairs to coaching vehicles was also placed in his charge. Between 1933 and 1937 Mr. Ratcliffe was a member of a team of auditors engaged in the investigation of London Transport Pool costs associated with the group companies. He was appointed Chief Accounts Clerk at Earlestown, L.M.S.R. in 1938 and Works Accountant, Earlestown, in 1946.

Mr. H. G. M. Viney, an Acting Divisional Inspector in the Railway Operating Department of the London Transport Executive has been elected Chairman of the Institute of Transport Metropolitan Graduate & Student Society for the Session 1951-52. He has contributed four papers to the Society, and in 1948 won a British Transport Commission Award for his paper "Recent Developments in Railway Operation." He is a past Treasurer of the Society, and was Chairman of the Provisional Committee which was formed to reorganise the Society in 1947.

The appointment is announced of Mr. H. I. Matthey as a Director of Morgan Crucible Co. Ltd.



**Mr. G. J. Aston**

Appointed District Operating Superintendent, Rotherham, Eastern Region

**Mr. A. M. Plumer**

Appointed District Engineer, Westland Row, Dublin, Coras Iompair Eireann

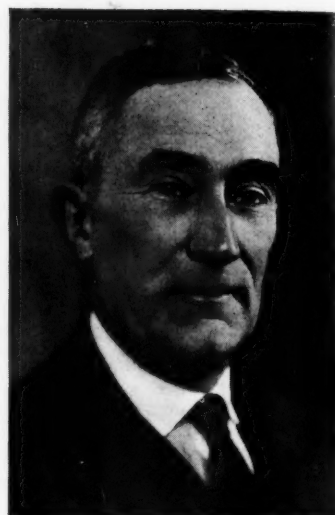


Photo)

(Lafayette

**Mr. P. W. Painter**

Who is retiring as Director & General Manager, Metropolitan-Vickers-GRS Limited

Mr. G. J. Aston, District Operating Superintendent, Derby, London Midland Region, who, as recorded in our July 27 issue, has been appointed District Operating Superintendent, Rotherham, Eastern Region, was educated at Christ's Hospital and Queen's College, Oxford, joined the L.M.S.R. in 1931 and was appointed Assistant District Controller, Toton, in 1938. He became Headquarters Inspector, Freight Services, Office of Divisional Superintendent of Operation, Derby, in 1940; Assistant Divisional Controller (Passenger Services), Office of Divisional Superintendent of Operation, Derby, in 1941; and District Controller, Patricroft, in 1943. From July to October, 1944, Mr. Aston was Acting District Controller, Willesden, and was then appointed Divisional Controller (Passenger Services), Derby. He became District Operating Manager, Derby, in 1948.

The President of the Transport Tribunal has appointed Mr. N. L. C. Macaskie, K.C., Mr. E. S. Shrapnell-Smith, C.B.E., F.C.S., M.Inst.T., M.I.Chem.E., and Captain B. H. Peter, C.B.E., A.M.I.E.E., to hear appeals formerly heard by the Road & Rail Appeal Tribunal. Mr. Macaskie will act as President as respects the hearing and determination of the proceedings.

The Cuban Government announces that a commission consisting of Dr. Ernesto Dihigo, former Minister of State, Dr. Emilio Nunez Portuondo, Cuban Minister to Panama, and Señor Felix Tapia, the present Cuban Government Intervenor in the United Railways of the Havana, has been appointed to enter into discussions with H.M. Ambassador at Havana and representatives appointed by the United Railways of the Havana & Regla Warehouses Limited, on the future of the United Railways.

Mr. A. M. Plumer, B.A.I., M.I.C.E.I., who, as recorded in our June 22 issue, has been appointed District Engineer, Westland Row, Dublin, Coras Iompair Eireann, has been acting in that capacity since 1949. He was educated at Mountjoy School, Dublin, and at Dublin University, and in

1921 became a temporary engineering assistant in the District Engineer's Office, Limerick, Great Southern & Western Railway. He was appointed a draughtsman in the District Engineer's Office, Cork, in 1922 and became, successively, Assistant to the District Engineer at Athlone in 1925, Westland Row, Dublin, in 1930, and Waterford in 1932. In 1936 he returned to Dublin as Assistant to Chief Engineer, Westland Row, and was appointed Acting District Engineer there in 1949. During the recent war Mr. Plumer was Chairman of the Great Southern Railways A.R.P. Committee. He is Chairman of the Permanent Way Institution, Irish Section, and of the Irish Transport Officers' Guild.

Mr. Frank Dickson, Chief Draughtsman in the development Division, Department of the Chief Mechanical Engineer (Railways), London Transport Executive, who, as recorded in our issue of July 20, has been appointed a Principal Executive Assistant, is 50. He received his technical training with the Great Western Railway at Swindon and subsequently went to the Metropolitan Carriage & Wagon Finance Company. He has been in the service of London Transport since 1929, and became a section leader in the drawing office in 1939, Assistant Chief Draughtsman in 1944 and Chief Draughtsman in 1946. Mr. Dickson was actively associated with the design and construction of the 1938 tube and surface line cars, as well as the "R" stock, which has recently entered service on the District Line.

Sir Archibald Boyd, Mr. A. T. Cheesley, and Mr. H. N. Edwards will continue as part-time directors, with Sir Archibald Boyd acting as Chairman, of the Patent Shaft & Axletree Co. Ltd., of which the board is being reconstituted under the Iron & Steel Act, 1949. Mr. B. S. Prichard, Managing Director, will also continue as a member of the board, and Messrs. R. L. Haskew, Works Manager, D. Cockburn, Chief Engineer, and P. J. Davies, Secretary & Accountant, are appointed directors. The directors retiring are Lt.-Colonel J. B. Neilson, C.M.G. (Chairman), Mr. W. Howard Williams, Sir Robert S. Johnson, Mr. R. W. Johnson, and Sir J. Reid Young.

Mr. P. W. Painter, Director & General Manager of Metropolitan-Vickers-GRS Limited, who, as recorded in our August 10 issue, is retiring from business on September 30, has been 23 years with that company. During this time Metropolitan-Vickers-GRS Limited carried out some very important signalling contracts and contracts for the mechanisation of marshalling yards, the latest of which are the three "NX" interlocking plants supplied to the Eastern Region under the Liverpool Street-Shenfield electrification scheme, which was described in our issues of December 15 and 22, 1950, and the mechanised yard at Toton, the second half of which was opened in September, 1950. Mr. Painter's early training was received at McKenzie & Holland, Worcester. In 1912 he left to join the Signal Department of the Bombay, Baroda & Central India Railway, and was appointed Acting Signal Engineer a year later. Early in 1914 he returned to England, because of illness, and when war broke out, joined the Austin Motor Co. Ltd. and later, Crossley Motors Limited, as Assistant Engineer on Buildings & Plant. In 1918 he joined the Signal Department of Siemens Bros. & Co. Ltd., Woolwich, and for five years was in charge of the Sales & Contract Works of that Department, including the unique installation of the one lever route system of control of the driverless trains on the Post Office underground railway system. A few years later, after the amalgamation of Siemens Bros. & Co. Ltd. and the General Electric Co. Ltd. Signal Departments, he joined Metropolitan-Vickers-GRS Limited in 1928. Mr. Painter became General Manager in March, 1936, and Director & General Manager in October, 1940. He has been a Member of the Institution of Railway Signal Engineers since 1912.

Mr. T. H. Moffitt, of Montreal, Assistant Treasurer of the Canadian Pacific Railway since 1941, has retired after 51 years' continuous service with the company.

We regret to record the death on June 12, at the age of 59, of Mr. E. A. Guthrie, Manager of the American Division of the Metropolitan-Vickers Electrical Export Co. Ltd.

## An American's View of British Railways

*Comment, criticisms, and commendation by a widely-travelled executive of a large U.S.A. undertaking*

When Mr. John Elliot, the Chairman of the Railway Executive, was returning from his recent visit to the United States, he met an executive of a large and well-known American corporation. Since his return to the United States this American executive, who travels a great deal, has written a letter to Mr. Elliot, giving him his impressions of travel while he was in this country. Below we give some extracts from the letter which Mr. Elliot has been good enough to give us permission to reproduce:—

Having now returned to the States, I am sending you, as I promised, a summary of my experiences with the British Railways, together with a few general comments.

I had no trouble with my book of mileage coupons. I tried them first in London when the porter at Claridge's took them to book a seat for me on the "Queen of Scots" from London to Harrogate. The next use came in Harrogate on a Sunday afternoon when the clerk in the booking office was a young lad who had, obviously, never seen coupons of this kind before. He knew where to look for the proper procedure, however, so I got my ticket quickly. In getting a ticket from Sheffield to Glasgow I encountered another lad who was quite confused but who sought advice from an older man who seemed well acquainted with them. At Callender, in obtaining a ticket to Edinburgh, the clerk extracted the necessary number of coupons and then asked for one penny in addition. When I suggested that he use another coupon, he replied, with good Scot thrift, that to do so would waste "tuppence," so I gave in and paid him the penny.

The final use was for my ticket from London to Southampton which I got at the office at 71, Regent Street. There was a small queue of Americans exchanging coupons for tickets, so that when my turn came I asked the clerk a very leading question: "Do you find these coupons a nuisance?" His reply was another question: "Do you wish one to be polite or honest?" I did find, however, that the coupons were rather bulky, so I was pleased to hear that you are going to decrease the size of the book. But watch out for the Scots and their pennies!

There were several incidents connected with tickets which might interest you. At Claridge's the porter had promised to get my seat reservation to Harrogate on the same day I asked about it—yet he failed to deliver it. When I asked why, he reported that the booking clerk had supplied one for the wrong day, so that transaction had to be done over.

In discussing with some English steel-makers the ways in which Government controls breed various minor rackets, I was told that a scheme had now grown up to avoid the necessity of making a seat reservation in person. They told me that the man at the gate to the platform who had the list of reservations usually withheld one or two seats so that by slipping him 2s. 6d. one could almost get a reserved seat as one boarded the train. It cost 1s. 6d. more than the usual procedure, but saved time. I didn't quite understand how the scheme worked, so I intended to try it sometime, but never had occasion to do.

The ticket for my seat on the "Queen

of Scots" caused a bit of confusion because the car letter was almost illegible. I thought it was L17, but my porter at the station assured me that there was no car lettered L. He believed it to be an H—but H17 was already occupied. Finally, by consulting some attendant with a sheet of seat assignments and going over his list, we discovered it was G17! I must say that on this occasion the porter carrying my luggage was far more helpful than most red caps would be in this country.

I must also compliment you on the "Queen of Scots." It is an excellent train.

There are a number of ways in which, I believe, your railway carriages are better than ours, excluding our crack all-Pullman trains. In the first place, they ride more smoothly—so easily, in fact, that I was able to write comfortably, which is impossible here. As to the reason for this I am not certain. I suspect that it may be due in part to the construction of the carriages themselves, but I also wonder whether your system of holding down the rails may not contribute. Instead of spikes in each tie, as in the States, you hold the rail in place with a steel piece and a block which holds the rail fairly rigid. For example, I observed that your rails do not move nearly as much as ours do when a train goes over them.

I thought the seats, both in first and third class, very comfortable, though I did miss the reclining seats now so common in our coaches. Your use of compartments seems to preclude the use of reclining seats, which is a pity.

In the matter of accommodation for luggage in the compartment, you are far ahead of us, as you are in the provision of ash trays and window space. On the "Queen of Scots" I was also impressed by the public address system and by the hangers for coats at each seat.

I noted with approval the use of grained wood. It certainly is attractive, though I suspect it may be relatively more expensive than steel panels are. I also wonder how your carriages stand up in an accident. Again, I am curious as to why the side walls of your carriages curve inward near the floor. It seemed to me that would be much easier to have the wall make a right angle with the floor. Perhaps it is a matter of custom.

The sleeper from Edinburgh to London was excellent—though I missed provision for my electric razor and also the toilet which we have in each bedroom.

Every Briton I talked to assured me that since nationalisation the British Railways had gone to pot. Since this sort of generalised criticism is always suspect, I often pressed for a specific complaint—but rarely got one. I was told that the carriages were now filthy, yet I never saw one as dirty as some of the suburban trains out of New York or the cars on certain runs in the Eastern parts of the States. I was told that the trains now ran late most of the time—yet every train I rode was on time. I was told that the service in general was very bad, yet by our standards it was always satisfactory. To confirm my impression I asked many Americans in England what they thought of your railways and all agreed that they were quite good. What I couldn't determine was whether there has, in fact, been any deterioration during the last three years. My own guess

would be that since you have been recovering from the war during this period, your performance has improved.

I must say, however, that the service and food on the restaurant cars was altogether extraordinary, especially in view of the price charged. I had a number of good meals, well served, on trains and I enjoyed them all. One attendant apologised because his uniform was soiled—because he had done extra duty in view of the shortage of help.

Another very pleasant surprise was the Caledonian Hotel in Edinburgh. It is a mystery to me how the standards of service and food can be maintained at the price they charged. I had one memorable dinner there with an excellent venison steak and a bottle of French wine bottled by the Hotels Executive that was most enjoyable yet was amazingly inexpensive.

## San Paulo (Brazilian) Railway Co. Ltd.

The directors of the San Paulo (Brazilian) Railway Co. Ltd. report an excess of expenditure in 1950 over receipts of £109,353. With the addition of administration expenses in England, £23,364 less receipts of £1,775, there remains a debit balance of £130,943. Including £67,412 brought in, interest and commission, provision against interests in subsidiaries now released, the available net revenue is £377,022.

Lt.-Colonel C. O. H. Bury, Chairman, in a reference to the company's supplementary claim states that the position of the claim papers at the moment is that second departmental examination by the Ministry of Transport and by the Ministry of Finance has been completed and the papers are now in the hands of the Consul General da Republica. This will be the last stage of their examination before delivery to President Vargas for his award. It was hoped that he would make his award without delay.

With reference to the "numerous legal disputes" in which the company is involved, the Chairman states that in the cases against the Federal Treasury the company had had a measure of success in the lower courts, but in every case where this had occurred the matter had been taken to the Supreme Court, whose decision was awaited. As regards the cases before the labour courts, the first and, so far as the claim on the company was concerned, the largest, amounting to £240,000, dated back to 1935. Little progress had been made with this in the past year.

The balance of payments made by the company for rolling stock and materials supplied since expropriation, amounting to £334,502, had not yet been refunded. The shareholding in, and debt from, the Cia. Fazenda Belem was now £473,693.

**NUTS AND BOLTS PRICE INCREASE.**—The Minister of Supply has made an order increasing the controlled maximum prices of bolts, nuts, and so on, as from August 13. The increased prices reflect the increase in the price of steel, under the Iron & Steel Prices (No. 2) Order, 1951, which came into effect on the same date, together with increases in the costs of the bolt and nut industry, including increases in wages, transport, and fuel costs. The Order—the Bolts, Nuts, etc., Prices (No. 2) Order, 1951, S.I. No. 1422—is on sale at H.M. Stationery Office.

## Ministry of Transport Accident Report

Near Mansfield, Eastern Region,  
British Railways; September 2, 1950

Brigadier C. A. Langley, Inspecting Officer of Railways, Ministry of Transport, inquired into the accident which occurred at about 10.4 a.m. on September 2, 1950, near Mansfield, when the 9.18 a.m. passenger train Nottingham Victoria to Edwinstowe, consisting of an N.2 class 0-6-2 tank engine, No. 69552, running chimney first, and two non-corridor third class brakes with a composite coach between them, travelling at about 35 to 40 m.p.h., became totally derailed on plain straight track near Mile Post 7 about 1½ miles beyond Mansfield Station.

The engine and first two vehicles overturned down a 10-ft. embankment, but the rear coach remained on the formation, tilted at an angle of 20 deg. There were only three passengers, all in the last coach, and none was injured. The driver and fireman remained on the footplate, but neither they nor the guard were hurt. Assistance was rapidly forthcoming. Single-line working was introduced, but the down line was able to be re-opened at 7.20 p.m. the same day. It was fine, with dry rails.

### Condition of Track

The track consisted of 85-lb. bull-head rails in 60-ft. lengths, laid on standard 10-in. x 5-in. x 8-ft. 6-in. wooden sleepers, 24 per rail, fastened with two-bolt fish-plates, and each chair was held by three coach screws. It had been laid new in 1940 and the rails had worn evenly to 81 to 82 lb. There were no signs of creep. The sleepers were in good condition and fastenings holding well; it was estimated that the track would be good for another ten years.

There was sufficient clean slag ballast around and at the ends of the sleepers, and the formation was dry, never having given trouble, even during the wettest weather. The line is a class C branch, maintained to a standard for a maximum speed of 60 m.p.h. The gradients, curves, and so on, affecting the track and trains passing over it are given on the drawings.

Measurements showed gauge generally to be good except where distorted immediately before the derailment, while sleepers were bearing well and there were few voids, mainly on curved track. There were variations of cross-level, however, all on the straight track, as shown, and the cant was continued on the straight for 135 ft. beyond the end of the curve to a point where it dropped to 7/8 in. and ran off to level in a further 27 ft. After that the cross-levels varied with first one rail and then the other and from 3/8 in. to 5/8 in. low. The last 85 ft. of track were distorted towards the cess side, and 4½ in. towards the 6 ft. side, after which the rails had been pushed outward.

The cross-levels, which would have tended to throw an engine to the left or right, were as follow:—

Section	Length	Cross-level variation	Throw, L or R, in direction of travel
A to B	27	Nil	L
B to C	18	Nil	—
C to D	16	Nil	R
D to E	40	Nil	L
E to F	25	Nil	L
F to G	27	Nil	—
G to H	31	Nil	L
H to J	26	Nil	R
J to K	29	Nil	L

The cross-levels from G onwards cannot be considered reliable on account of distortion, but indicate the regular pitch from E onwards, which averages 27 ft. and would give rise to oscillations at the rate of 147 per min. at 45 m.p.h. and 130 per min. at 40 m.p.h. The first mark of derailment was a heavy score, 3 ft. 2 in. long, on the side of the cess rail some 25 ft. from the rail joint followed by a light mark 3 ft. 9 in. long from the inside to the outside of the rail, with corresponding marks on the top of the other rail. Thirty yards of track were distorted before the derailment and 80 yd. destroyed beyond it. The engine and train passed over an 8 ft. wide occupation bridge, and swept away the downside coping stones, steel stanchions and railings.

### The Locomotive

The locomotive had been received from Doncaster works on May 5, 1949, after general overhaul, and had run approximately 27,776 miles since. It left Nottingham with full bunkers and tanks; the latter were half-full when the accident occurred. The heaviest axle load was 19 tons and the rigid wheelbase was 16 ft. 3 in. Leading and trailing coupled wheel springs and trailing pony springs were of laminated type, but the driving wheels had double helical springs. The respective periodicities were 147, 164 and 198 per min. Movement of the pony truck was restricted by two helical springs as soon as the axlebox side play was taken up. Each spring produced a force of only 15 cwt. when compressed 2 in.

It was found that the top-plate of the left-hand trailing coupled wheel spring and one of the right-hand helical driving wheel springs itself had become broken some time before the accident. The periodicity of the former spring might have been affected by its broken top-plate and the periodicity of the engine as a whole probably had been made lower. Side clearances of coupled wheel axleboxes was good, but the force which should have been exercised by the side control springs of the pony truck was reduced to a negligible amount from wear and the fact that the right-hand liner was missing. The truck was last periodically examined on November 30, 1949, when the liners were passed as satisfactory, since when the engine had run 12,000 miles. The tyres were in good condition with well-formed flanges.

There was considerable superficial damage to the engine, the most significant being found on the left-hand trailing coupled wheel and axlebox, the details of which showed that some object must have become momentarily trapped between the spokes and the buckle and exerted so much force that the buckle was pressed hard against the horn stay. The peculiar nature of this damage suggested that the object was probably "L" shaped and of substantial thickness. It was found that half a rail chair could be slid into a position consistent with the marks on the spoke and buckle and it was sufficiently thick to press the buckle on the horn stay. Immediately the axlebox broke, the spring became detached and thereby unloaded nearly all the weight from the left trailing coupled wheel. There was only one part missing. There was a clean fracture in the left-hand driving brake beam caused by some severe blow, sufficient not only to break it but dislodge

the piece from the broken hanger, and it seems clear that this was done after the derailment.

The N.2 class of engine, in service for the last 30 years, has been known as liable to hunt. Certain derailments with such engines have occurred from time to time. Most of them have been engaged on main-line suburban services out of Kings Cross, where they have had an unbroken safety record for many years, but the standard of main-line maintenance is high and, as the engines normally run bunker first on the down-grade run into the terminus, liability to hunt is reduced.

### Evidence

The driver said that, when travelling with the regulator open down the bank towards Mansfield Colliery at about 20 to 25 m.p.h., he felt a lurch to the left, and then the engine started to rock violently. He realised it was derailed, so closed the regulator and braked, holding on as they went down the bank and overturned. He was sure there was no unusual rocking or vertical movement after leaving Mansfield; the first indication that anything was wrong was the lurch followed by violent vibrations a few seconds later. His speed was not more than 25 m.p.h. because it was unnecessary to travel faster to keep time. He had not had much experience with the N.2 class engines, but had noticed nothing unusual in their running. The evidence of the fireman and guard confirmed these statements, as far as they were concerned.

A driver who acted as pilot-driver on the 8.25 a.m. express, Leicester to Scarborough, the last train to pass over the line before the accident, said that as they were allowed ample time they were only travelling at about 20 to 25 m.p.h. when passing the scene of the accident. The branch was known to be a rough section of line, but he noticed nothing unusual there, nor did he see any sign of an obstruction. This express passed at 9.45 a.m. and had been preceded by five passenger trains and a freight train. The express was examined, and no defects or missing parts were reported, nor were any reports of obstructions or rough riding received from drivers of other trains.

The acting ganger was proceeding by bus to his inspector's office when he saw the train overturn. He immediately alighted and went to the scene, where he met the inspector. He had not noticed any serious defects the previous afternoon. He walked over the whole of his passenger lines once a week, checking alignments and cross-levels by eye. He occasionally used his gauge and checked cross-levels if he thought anything was wrong. He had four curves and examined one thoroughly each week, checking gauge and cant every 30 ft., but he did not check the straight track for variation in cross-level.

He planned to overhaul thoroughly every six months, although he attended to bad spots more often if necessary. The length where the derailment occurred was on a dry bank, had never given trouble, and he had not done any work there for the last five months. The line was patrolled daily and no signs of interference with the track or of any obstructions had ever been seen.

The inspector examined the line when he arrived and found no signs of an obstruction having been there. He had checked the gauge and cant on the curves



three times in every rail length on August 23 and cross-levels and gauge every 50 yd. on the straight. The track was in very good condition. There were one or two low joints, but they had not appeared so low as they did after the accident. He had travelled on a goods engine at about 35 m.p.h. the day before that, and did not notice any lurching. He had never had complaints from drivers regarding this section, nor had the track been knocked out of alignment by any of the engines.

The chief inspector had walked over the branch on August 9 and found this section in good condition. The rails, fastenings and sleepers were good for another eight to ten years. There were a few low joints, but nothing seriously wrong. This ganger's length compared quite favourably with the main line, and he would have classified it at 85 points out of 100. The maximum and minimum for the branch were 86 and 83. Poor lengths were those that fell below 80. He did not consider that the slight variations in cross-levels could have caused the accident, which he could not account for, because there was no subsidence and no sign of obstruction.

A length of track was set up to represent as far as possible the conditions at the site, and cross-level variations of  $\frac{1}{8}$  to  $\frac{1}{4}$  in. were not easily discernible, and were unlikely to have been seen by a ganger in the course of his normal inspection. Only by careful examination could these slight defects be picked out. They were not sufficiently marked to be readily noticed by the ganger on the previous day, unless he had been gauging and checking cross-levels. He might have missed the curiously regular pitch from side to side.

#### Inspecting Officer's Conclusion

A derailment on plain track usually is due to (a) excessive speed, (b) defective locomotive, (c) defective track, (d) an obstruction, or a combination of two or more of these. It was clear that the left-hand coupled wheel had mounted the rail but what caused it to do so was not so well defined.

There was no evidence to suggest that the train was travelling at high speed and no reason for the driver to do so. Brigadier Langley doubts whether speed was more than 35 to 40 m.p.h., compared with a permitted maximum of 60. He is satisfied that the train was being properly controlled. Examination of the engine showed excessive side play in the pony truck and the broken springs mentioned above, which would have affected the balance of the engine. Additional variations in axle loading could not be entirely discounted, because the engine had run 9,500 miles since last being weighed on January 26, 1950, since when the springs might have got out of adjustment. Nevertheless Brigadier Langley doubted whether these defects alone were sufficient to have caused derailment at moderate speeds.

The track, generally speaking, was good, with no sign of chair movement, gauge spreading, or subsidence. The only material defect was the variation in cross-level, which was remarkably regular, though the actual differences at any one point were not excessive. The effect, however, was to produce a sudden variation in cant gradient on level track, varying from 1 in. in 40 to 1 in. in 25 ft., the latter being high for 60 m.p.h. but not excessive for 40. These would undoubtedly cause some lurching, which should not have become dangerous on a properly balanced engine running at comparatively low speed. There was no question of heat stresses in this case.

The unusual damage to the coupled

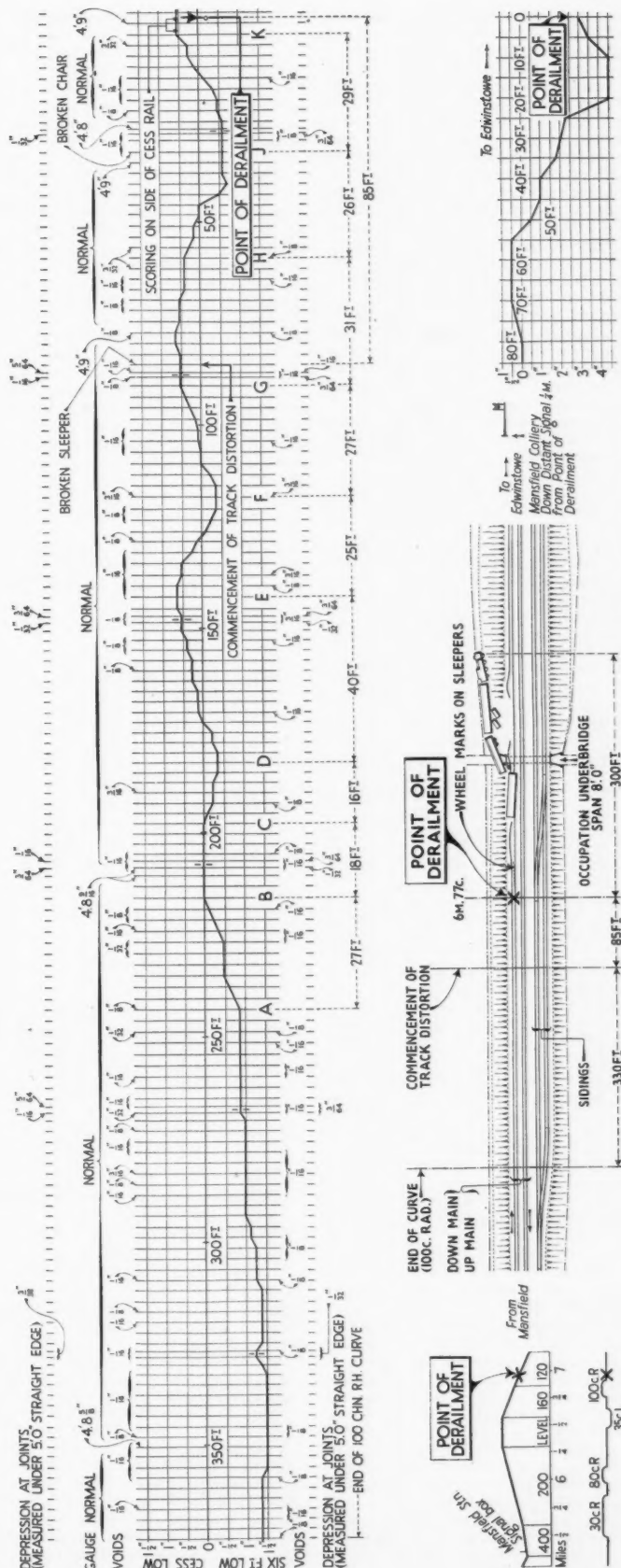


Diagram illustrating circumstances of accident near Mansfield, Eastern Region, September 2, 1950

wheel and spring buckle might lead one to think that the accident was due to an obstruction. The jamming of an object between the wheel and spring would momentarily lock the wheel and skid the others, probably twisting the engine slightly, and, coupled with violent disturbance of weight when the axle box broke, might well have caused derailment. The lurch would be consistent with this.

On the other hand, one would expect the track to be distorted, and it is difficult to conceive how a heavy object, a chair, or a substantial piece of metal could have been thrown up from the track. The express had passed safely 19 min. before, and had an obstruction fallen off an earlier train, surely it would have hit it. Nothing was found missing from that train, and the only part of the derailed engine which might have caused damage was the left-hand end of the driving brake beam, broken off clean in the hanger. This fracture obviously could have been caused by some blow, which might well have happened after but not before the derailment. The possibility of an obstruction cannot be ruled out, but Brigadier Langley considers it more probable that the piece of metal became wedged in the wheel and spring buckle after the accident.

After reviewing all these facts he formed the conclusion that the cause of the derailment had to be sought in an analysis of the effects of track conditions on an engine which probably had become particularly sensitive to them. It is likely that low joints on the curve set up minor oscillations, slightly increased perhaps by water surging in the tanks, but not becoming serious until the straight track was reached, where regular cross-level changes increased them. Then build-up must have been unusually rapid, probably due to short pitch cant variations synchronising with the periodicity of the engine.

Swinging of the trailing end, 13 ft. 4 in. beyond the fixed wheelbase, would have magnified the force of the lateral blows until they reached a dangerous climax, and any wheel loading variations would have accentuated this. The theory of engine hunting is borne out by the track distortions, etc., all tending to show that the leading wheel became forced over the rail when it was carrying little weight.

The past history of this class of engine leads one to think that it reacts unfavourably to uneven track. By rare mischance all the unfavourable factors were working together on this occasion. Brigadier Langley does not hold the maintenance staff responsible, either in the case of engine or the track, and points out that the running of N.2 class engines on secondary lines is not necessarily dangerous. The conditions were unusual, but it emphasises once again that these engines are unduly sensitive to track irregularities.

#### Recommendations

It is recommended that if this class is to run on these branches, consideration should be given to a more frequent examination of springs and bearings, to ensure wheel loadings being maintained and side-play not allowed to become excessive. Speed was not a factor, but it would be prudent to limit it for these engines on secondary lines, and it is recommended also to review the maximum permissible speeds on this particular branch because of the difficulty of maintaining long lengths of line in first-class condition with trolley gangs, as track which cannot be fettled more than once in six months must inevitably deteriorate between overhauls. In such circumstances a maximum of 60 m.p.h. is somewhat high.

## Parliamentary Notes

### B.T.C. Order Confirmation Bill

The British Transport Commission Order Confirmation Bill passed the report stage in the House of Commons on July 25, and was read the third time and passed on July 26.

### Festival Gardens Railway Accident

The Lord Privy Seal (Mr. R. R. Stokes) stated in reply to questions in the House of Commons on July 31 on the recent head-on collision on the miniature railway in the Festival Pleasure Gardens at Battersea that one of the drivers had failed to carry out the very simple system in operation to prevent such an occurrence. There was no signalling system, but other forms of control were used. There were no electric or mechanical safety devices installed. Regarding insurance of passengers, Mr. Stokes said that the Festival Gardens Company insisted on all concessionaires being adequately insured against loss of life and injury, and the concessionaire concerned was so covered. The Company itself was fully covered against contingency liability, if any.

### Train Fire Near Huntingdon

Mr. David Renton (Huntingdon—Nat. Lib.-C.) on July 30 asked the Minister of Transport for a statement on the fire in an express train near Huntingdon on July 14.

Mr. Alfred Barnes (Minister of Transport) expressed his sympathy with the injured and their relations and said that an Inspecting Officer of Railways visited the site on the following day to examine the burnt-out coaches, and opened his inquiry on July 20. It would not be right to make any further statement until investigations were complete and the report published.

Mr. D. G. Logan (Scotland, Liverpool—Lab.) drew the Minister's attention to a fire, not long before, in a Liverpool to London train, and to the opinion of the guard of the train that the vestibule connections needed better inspection; one of these had caught fire.

Major E. A. H. Legge-Bourke (Isle of Ely—C.) raised the question of the construction of railway carriages of wood, a practice abandoned in many countries.

Mr. Barnes replied that these matters were always discussed between his Department's inspectorate and the railways. Generally, the latter were ready to go far to meet the recommendations of the inspectorate.

## Questions in Parliament

### Transport Users and Fare Increases

Mr. Arthur Lewis (West Ham North—Lab.) on July 23 asked the Minister of Transport whether he would take the necessary action to ensure that the public users of road and rail transport had adequate opportunities of presenting their case for reductions and reclassification of fares, where necessary.

Mr. Alfred Barnes, in a written answer, stated: A scheme covering all the road and rail passenger services provided by the Commission has been submitted to the Transport Tribunal in accordance with the provisions of the Transport Act and will be considered by the Tribunal at public hearings at which bodies representing users of these services will be heard. For services not provided by the B.T.C., bus and coach fares are settled

under the Road Traffic Acts by the Licensing Authorities for Public Service Vehicles, to whom representations may be made, and tram and trolleybus fares by myself after public inquiry when fares exceed the statutory maxima.

### Fencing of Railway Lines

Mr. A. C. Bossom (Maidstone, C.) on August 2 asked the Minister of Transport, if he would consider assuming responsibility for maintaining fences along railway lines in cases where the original railway company contracted out of this liability when the railway was constructed.

Mr. Alfred Barnes wrote in reply: No; I see no reason for assuming such a responsibility.

### Carriage of Mails

Mr. R. Reader-Harris (Heston & Isleworth—C.) on July 18 asked the Postmaster General what payment was made by the Post Office to the B.T.C. for carriage of mails; and to what extent the arrangements had been changed since nationalisation.

Mr. Ness Edwards stated in a written answer: About £7½ million to the Railway Executive; about £400,000 to units of the Road Haulage Executive and private hauliers. There has been no change in arrangements.

### Level Crossings

Mr. David Renton (Huntingdon—Nat. Lib.-Con.) on July 9 asked the Minister of Transport what progress had been made in his examination of recommendations made by the B.T.C. in their report on occupational and accommodation level crossings.

Mr. Alfred Barnes: The examination is still proceeding. The recommendations deal with the matter from the B.T.C. viewpoint, and require consideration both by the Government and by highway authorities and others affected.

Commander Douglas Marshall (Bodmin—C.) on July 9 asked the Minister of Transport how many railway level crossings had no gates in Cornwall and in the whole of the United Kingdom, respectively; and how many accidents there had been.

Mr. Alfred Barnes: The only public level crossings without gates are over railways constructed under Light Railway Orders. There are approximately 370 in the United Kingdom, of which five are in Cornwall. The corresponding figures for accidents in the year ended May 31, 1951, were fifteen and one respectively.

### Railway Traffic Embargoes

Captain Peter Thorneycroft (Monmouth—C.) on July 2 asked the Minister of Transport whether he would introduce legislation to enable "A," "B," and "C" licence holders to carry traffics immobilised by the periodic embargoes imposed by British Railways.

Mr. Alfred Barnes: No. Embargoes are an established method of overcoming railway traffic congestion and are usually limited in scope and of short duration. Powers are already available to enable "A," "B," and "C" licence holders to carry traffic outside the terms of their licence to meet emergencies.

Mr. Geoffrey Wilson (Truro—C.): One firm in my division had 57 stations out of 58 closed by embargoes on June 1 this year, for eleven days.

Mr. Barnes: That has prevailed on many occasions in railway history to overcome temporary difficulties.

Air Commodore A. V. Harvey (Macclesfield—C.): Will the Minister tell the House how he intends to get over these difficulties?

Mr. Barnes: By the method we have always adopted. If there is any difficulty powers exist for the purpose of trying to overcome it, but these temporary embargoes on railway traffic are entirely different from a state of emergency.

#### Capital Investment in Roads and Railways

Sir Ian Fraser (Morecambe & Lonsdale—C.) on July 2 asked the Minister of Transport whether he had any statement to make about the level of capital investment in road, rail, and other transport, in the light of the overall reductions now proposed; and what items were to be afforded priority.

Mr. Alfred Barnes in a written answer stated: As the Chancellor of the Exchequer has already informed the House, the provision of capital investment in roads and railways allows for increased expenditure in 1951, compared with that of 1950. The provision for ports also allows for some increase. Priority will be given to main-

tenance of trunk and classified roads, additional rolling stock and essential maintenance of railways works and structures, and further reconstruction at ports.

#### British-Owned Railways in Cuba

Major Sir Jocelyn Lucas (South Portsmouth—C.) on July 9 asked the Secretary of State for Foreign Affairs if he could state the terms on which the British-owned railways in Cuba were to be nationalised; and if he would take all possible steps to protect British interests.

Mr. Herbert Morrison in a written answer stated: The President of Cuba has stated that he proposes to recommend to Congress to nationalise the United Railways of Havana, but that his Government has no intention of damaging the legitimate interests of foreign countries in Cuba and are prepared to exchange views with interested parties. The Ambassador at Havana has addressed a note to the Cuban Government accepting on behalf of H.M. Government and the Company the invitation to begin discussions. Close contact is being maintained with the Company both in

London and Havana. As regards the second part of the question put by Sir Jocelyn Lucas, I can assure Sir Jocelyn Lucas that all possible steps will be taken to protect British interests.

#### Railways in Rhodesia

Mr. James Johnson (Rugby, Lab.) on June 27 asked the Secretary of State for Commonwealth Relations what schemes had been proposed for a railway from Southern Rhodesia to the Atlantic coast.

Mr. P. C. Gordon-Walker stated in a written answer: Any such proposal would be for consideration in the first place by the Government of Southern Rhodesia rather than the United Kingdom Government. Although suggestions have been made from time to time for the construction of a railway from Southern Rhodesia to a port on the West coast, no detailed investigation of possible routes has been made. I understand that the Government of Southern Rhodesia considers that priority should be given to a further line to the East coast and to other railway improvements.

### British Railways Reopen Piccadilly Office

The travel information office of British Railways in Piccadilly Circus which was used during the war as a Y.M.C.A. for New Zealand troops has been completely modernised and was reopened on July 9. Materials used in the reconstructed office, which was designed by Mr. J. M. Harrison, Architect to the London Midland Region, British Railways, were readily available under present conditions.

Most of the woodwork is painted although the fittings and radiator casings are of natural wax polished sycamore. Chairs and stools are covered with deep-blue crash linen with white P.V.C. trimmings. A problem was set by the ticket racks, which were deep red mahogany with deal interiors, and in the interests of economy it was desired to re-use them. Chemical bleach treatment proved most effective in this case and the softwood

interiors were painted in pleasing contrasting colours with flat oil paint.

A high background noise level made acoustic absorption desirable and Celotex suspended ceiling tiles were used. This ceiling was hung 2 ft. 6 in. below the existing level to correct the disproportionate height and to hide existing beams. This space is also used to assist in the extraction of vitiated air. The windows give an unobstructed view of the interior from the street. Vertical aluminum tubes between the window bottom and the ceiling enable display material to be clipped on. These add to the decorative effect without forming a physical barrier between the interior of the office and the street.

A modified air conditioning system is installed in which air is taken in at basement area level, passed through an expendable filter, and then introduced through the radiator casings under the windows. Vitiated air is extracted from a duct over the counter and discharged to the street.

### Contracts & Tenders

The Crown Agents for the Colonies have recently placed a contract with the Gloucester Railway Carriage & Wagon Co. Ltd. for 100 bogie high-side wagons for the Gold Coast Railway.

The 25 "S1" class 0-8-0 engines and tenders ordered by the South African Railways from the North British Locomotive Co. Ltd., some details of which were given in our August 10 issue, will follow general South African Railways standard practice. The boiler, which will be pressed to 180 lb. per sq. in. is to be equipped with a 30-element superheater, incorporating a multi-valve regulator header, supplied by the Superheater Co. Ltd. and will be fitted with an all-welded steel firebox. The frames are to be of bar construction. Vacuum brake equipment is to be fitted to the engine and tender, with connections to train.

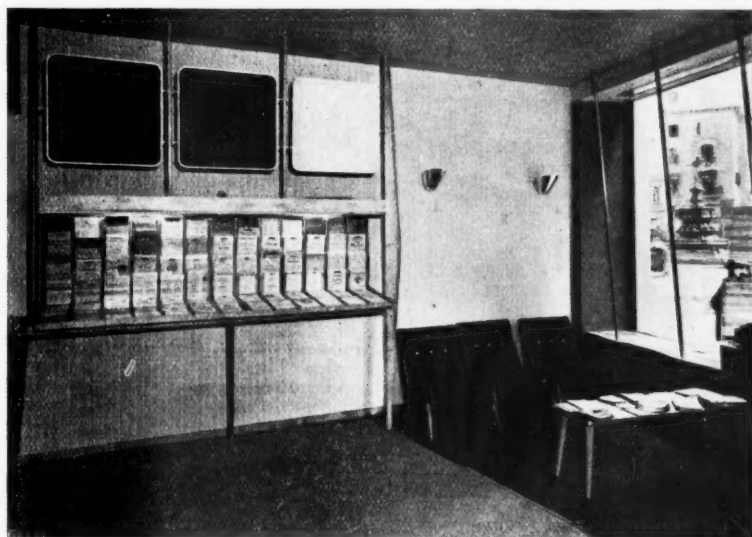
The 23½-in. dia. × 25-in. stroke cylinders will be of cast iron and the reversing gear will be South African Railway standard power-operated type. The tender tank and bunker will be of welded and riveted construction and tender underframes will be built-up of steel sections adequately stayed by steel castings and steel plates.

The Dunlopillo Division of Dunlop Rubber Co. Ltd. is supplying Dunlopillo cushions and armrests for 17 of 21 all-steel lightweight coaches which are being built for the Peruvian Corporation by Cravens Railway Carriage & Wagon Co. Ltd., as follows:—

- 5 first class coaches.
- 8 second class coaches.
- 4 combined first class and kitchen cars.

The remaining four coaches in this order are luggage and parcel vans.

**IMPORT DUTY ON RAILWAY SLEEPERS.**—The Board of Trade has under consideration a proposal that the 10 per cent. general ad valorem duty on railway sleepers in the form of square sawn-softwood should be replaced by a duty of 8s. per standard of 165 cub. ft. Representations should be addressed to Board of Trade, Industries and Manufactures Department, Division 1B, Thames House North, S.W.1.



Section of the travel information office in Piccadilly Circus which has been rebuilt and redecorated by British Railways



## Notes and News

**Draughtsman for Electrical Equipment.**—A firm of civil engineering contractors in Liverpool has a vacancy for a draughtsman for arrangements of electrical equipment. See Official Notices on page 195.

**Draughtsman (Civil Engineering) Required.**—A draughtsman (civil engineering) is required by the Nigerian Government Railway for one tour of 18 to 24 months in the first instance. See Official Notices on page 195.

**Assistant Engineer (Mechanical) Required.**—There is a vacancy in the London office of the Crown Agents for the Colonies for an assistant engineer (mechanical) aged between 25 and 35 years. See Official Notices on page 195.

**Troop Train and Express in Collision in Louisiana.**—On August 10 fourteen persons were killed and 60 were injured when a troop train and an express collided head-on near New Roads, Louisiana, about 60 miles north-west of Baton Rouge. Both diesel locomotives and several telescoped coaches caught fire.

**Iron and Steel Output in July.**—Steel production in July, which was affected by the annual holidays, was at an annual rate of 13,317,000 tons, as compared with 14,367,000 tons in July, 1950. The output of pig-iron was at an annual rate of 9,484,000 tons as compared with 9,099,000 tons a year ago.

**United States Credits for Mexican Railways.**—The United States Export-Import Bank has extended two credits totalling \$56,000,000 (£20,000,000) for the rehabilitation of the Mexican railways. Of this sum \$51,000,000 (£18,214,000) would be used for improving the National Railways of Mexico. The second credit of \$5,000,000 (£1,785,000) would be used to rehabilitate the Ferrocarril Mexicano. The credits may

be increased as further surveys of the railways' needs are completed. The money, part of an overall credit of \$150,000,000 (£53,571,000) authorised by the bank in 1950, will be spent in the U.S.A. on rail accessories, track machinery, locomotives, coaches and signalling equipment.

**United Steel Companies Limited: Exhibits.**—The stand of the United Steel Companies Limited at the Engineering, Marine & Welding Exhibition will again provide a communal exhibit on behalf of their various subsidiary and associated companies. The display will illustrate the works engaged in producing such widely differing products as strip down to 1/1,000 th in. or slabs up to 17 in. thick.

**Coal Production Plans.**—The Minister of Fuel & Power has stated in a letter to the National Union of Manufacturers that the £600 million plan of the National Coal Board to increase coal production to 240 million tons a year by 1961 was flexible and would be revised periodically. If it were found that the long-term demand for British coal for home use and export was likely to be less than this figure it would be revised.

**Fork-Lift Trucks at Olympia.**—This month Conveyancer Fork Trucks Limited will be exhibiting at the Engineering, Marine & Welding Exhibition, on the stand of their parent company Rubery Owen (Darlaston) Limited. A fork truck, Model E2-20/3W, will be shown. This is an electric truck having a lift capacity of 2,000 lb. at 20 in. load centre. The truck will be shown fitted with a 6-ft. stacking unit although 9 ft. and 12 ft. units are supplied. It is a 3-wheel vehicle with the very small turning radius of 60 deg.

**Special Excursion for British Association Members.**—On August 11 a British Association party left Edinburgh Princes Street by special train at 9.44 a.m. for Oban. The excursion went *via* Dumbarton, Gare-

loch, Loch Long and Loch Lomondside to Crianlarich; thence by Kilchurn Castle, Pass of Brander, and Connel Ferry to Oban. On the return journey, the train left Oban at 6.48 p.m., and from Crianlarich went via Glen Dochart, Glen Ogle, Strathyre, Callander, and Stirling. Lunch and dinner were served on the train.

**Jurisdiction of Road & Rail Appeal Tribunal.**—The Minister of Transport has appointed August 15, 1951, as the date on which the jurisdiction of the Road & Rail Appeal Tribunal is transferred to the Transport Tribunal. Any communication which would have been addressed to the Road & Rail Appeal Tribunal should now be sent instead to the Secretary, Transport Tribunal, Watergate House, 15, York Buildings, Adelphi, London, W.C.2. The office of the Appeal Tribunal at 6, Spring Gardens, London, S.W.1, will become a sub-office of the Transport Tribunal.

**Advance Booking Office for Paisley Fair Holidays.**—In conjunction with the management of Ferguslie Mills, Paisley, the Scottish Region of British Railways opened a booking and enquiry office at the mills in connection with travel at Paisley Fair. This was a development of a similar scheme at the Anchor Mills. The office was staffed by two clerks from Paisley Gilmour Street Station, who from 12 noon until 2.30 p.m. dealt with inquiries and sold tickets dated in advance for the Fair holidays which started on August 4.

**Transformer Welding Equipment.**—Many new exhibits will be shown at the Engineering, Marine & Welding Exhibition by Murex Welding Processes Limited, including a new 50-amp. transformer welding equipment and a newly designed 250-amp. transformer equipment, together with a recently developed low-voltage device for a.c. welding plant, the Elin-Murex automatic welder, and some new types of electric-arc welding electrodes. Other types of Murex electric arc welding equipment will be engine-driven sets prepared with cut-away sections. The exhibit will be completed by a display of Murex arc welding electrodes the range of which now covers over 70 different types.

**Vehicle Registration and Licensing Regulations.**—The Minister of Transport has made the Road Vehicles (Registration & Licensing) Regulations, 1951 (S.I. 1951, No. 1381), and the Road Vehicles (Index Marks) Regulations, 1951 (S.I. 1951, No. 1380), which came into effect on August 15. The new regulations are in the main a consolidation of four earlier ones, although certain relaxations have been introduced, and there is special provision for the exhibition of registration marks on works trucks. The registration marks of pedestrian-controlled vehicles may be of the smaller dimensions already permitted for motor bicycles.

**Holyhead - Dun Laoghaire Service.**—The London Midland Region has issued a statement regarding the inability to convey all intending passengers from Dun Laoghaire to Holyhead by the night sailings on August 10 and 11. Sailing tickets, it is pointed out, were issued for the complement of the morning (2,000) and evening (1,100) sailings on August 10, but only 1,150 left by the morning steamer, while the evening vessel conveyed its complement of 1,100 passengers. A relief vessel, which had been pre-arranged, sailed later that evening with 2,000 passengers, leaving

### Mobile Inquiry Bureau in North Wales



Mr. A. E. Hammett, Commercial Superintendent, London Midland Region, paid a visit recently to a British Railways mobile inquiry bureau at a North Wales camping site, and is seen in the centre of the photograph reproduced above, with Mr. F. H. Fisher, District Traffic Superintendent, Chester, on his right

## OFFICIAL NOTICES

## CROWN AGENTS FOR THE COLONIES

**DRAUGHTSMAN (Civil Engineering)** required by the Nigerian Government Railway for one tour of 18 to 24 months in the first instance. Salary (including expatriation pay) according to qualifications and experience between £1,075 and £1,230 a year, plus temporary increase between £82 and £93 a year. Outfit allowance £60. Free passages for officer and wife and assistance towards the cost of children's passages or their maintenance in this country. Liberal leave on full salary. Gratuity at the rate of £150 a year on satisfactory completion of service. Candidates must have had at least five years' experience in the drawing office of a Railway Civil Engineering Department (or Consulting Engineers or Contractors with practice in railway work). Knowledge of design and construction details of civil engineering structures and railway track work is required, including ability to take off quantities, prepare estimates, and draft general specifications. Apply at once by letter stating age, full names, in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M.17417.A on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

**CIVIL Engineering Contractors** in Liverpool (Kirkby) require Draughtsmen for arrangements of electrical equipment. Mechanical or electrical experience desirable but not essential. Age 18-30. Salary according to age and ability. Applications in writing to: THE STAFF OFFICER, B.I.C.C. LIMITED, Prescott, Lancs.

**TRANSPORT ADMINISTRATION IN TROPICAL DEPENDENCIES.** By George V. O. Bulkeley, C.B.E., M.I.Mech.E. With chapters on Finance, Accounting and Statistical Method. In collaboration with Ernest J. Smith, F.C.I.S., formerly Chief Accountant, Nigerian Government Railway. 190 pages Medium 8vo. Full cloth. Price 20s. By post 20s. 6d. *The Railway Gazette*, 33, Tothill Street, London, S.W.1.

## CROWN AGENTS FOR THE COLONIES

**ASSISTANT ENGINEER (MECHANICAL)** required for the London Office. Salary scale £475-£25-£750. The £475 minimum is linked to entry at age 25, with the addition of £25 for each year above that age up to £600 and subtraction of £25 for each year below 25. Extra duty allowance of 8 per cent. of annual salary also payable at present. Engagement will be on unestablished terms with a prospect, after satisfactory service, of admission to the established and pensionable staff in due course, vacancies permitting. **Qualifications.**—Candidates between 25 and 35 years of age should have a good general education up to matriculation standard and have passed the qualifying examination for associate membership of the Institution of Mechanical Engineers, or equivalent. They should have served an apprenticeship or pupillage in the Rolling Stock Department of the British Railways, or with a firm of rolling stock manufacturers. Subsequent drawing office experience in the design of all-steel carriages and wagons. A knowledge of diesel railcar design is desirable together with a good knowledge of modern workshop practice. **Duties.**—The duties are preparation of contract specifications, examining and approving drawings with calculations on design, technical correspondence and general contract work. Apply at once by letter, stating age, full names, in block letters, and full particulars of qualifications and experience, and mentioning this paper, to the CROWN AGENTS FOR THE COLONIES, 4, Millbank, London, S.W.1, quoting M.2391.B on both letter and envelope. The Crown Agents cannot undertake to acknowledge all applications and will communicate only with applicants selected for further consideration.

**YOUNG ENGINEER** with railway experience required by large firm manufacturing railway rolling-stock auxiliary equipment, situated 30 miles north of London. Design work and customer contact. Full apprenticeship and University Engineering Degree desirable, but not essential. Write giving full details of experience, age, and salary to Box K. 406, c/o STREETS, 110, Old Broad Street, E.C.2.

**THE PORT OF LONDON AUTHORITY** invite applications from British subjects for appointment as Assistant Engineers in the Docks Divisions of the Chief Engineer's Department—scale of pay £800 by annual increments of £50 to £1,000 per annum. Preference will be given to candidates not over 40 years of age. Candidates must be Corporate Members of either the Institution of Civil Engineers or the Institution of Mechanical Engineers with experience in maritime civil engineering construction and maintenance or in the erection and maintenance of machinery and plant used in Dock and Railway Undertakings. Successful applicants will be required to become members of the Port of London Authority's contributory superannuation scheme. In certain cases existing pensionable service is transferable. Application must be made on a form to be obtained from the ESTABLISHMENT OFFICER, PORT OF LONDON AUTHORITY, Trinity Square, E.C.3. F. W. NUNNELEY, Secretary.

**APPLICATIONS** are invited for an experienced Traction Motor Designer for work in connection with Diesel-electric traction. Essential qualifications include good academic attainments, a wide experience of the electrical and mechanical design of traction motors and the manufacturing techniques associated with these machines. Applications, giving full details of qualifications, training and experience, should be addressed to the GENERAL MANAGER, BRUSH/BAGNALL TRACTION LIMITED, Loughborough, Leics.

**GLOSSARY OF WOOD.** A technical dictionary for all associated with timber and its uses. Ten thousand terms about timber—the common and the little known, the old and the new. Ten thousand definitions covering the entire field of timber and its uses—growth, marketing, utilisation. The commercial timbers, their qualities and uses, tools and wood-working equipment, are all here explained simply, concisely and accurately. Illustrated by many clear line drawings. Price 21s. net. By post 21s. 9d. Tothill Press Limited, 33, Tothill Street, London, S.W.1.

1,100 for the morning boat on Saturday, August 11, which was also a controlled sailing. Because more than 500 passengers with sailing tickets did not arrive for the morning sailing on Saturday, it was possible for 500 of the 1,100 outshipped passengers from Friday's sailings to be accommodated. The balance was conveyed by a relief vessel arranged specially. Over 14,000 persons, travelled by the Holyhead-Dun Laoghaire route in 24 hr. Facilities at Dun Laoghaire are limited, and for some time British Railways have urged the need for better accommodation there. Mr. John Elliot, Chairman of the Railway Executive has sent a telegram to Mr. J. A. Nugent, Chairman, Irish Tourist Board, pointing out that British Railways have provided two new vessels costing £2 million as well as improved facilities at Holyhead Dock, whereas passenger accommodation at Dun Laoghaire Pier is still inadequate.

**British Railway Coal and Steel Carriages.**—During the weekend to August 13, British Railways cleared 213,140 tons of coal from deep-mined pits and open-cast sites. The latest figures for iron and steel show that 155,626 tons were conveyed during the week ended August 4 from the principal steelworks.

**Indian Rail Strike Postponed.**—The All-India Railwaymen's Federation has decided to postpone for two months a strike scheduled to begin on August 27. The Federation's Action Council, after protracted deliberations, announced it would review the general political situation in October before reconsidering strike action. The Federation ordered the strike after arriving at a deadlock in negotiations with the Government over wage increases and other facilities.

**British Railways Standard Tank Engines.**—On August 9, one of British Railways Class "4," 2-6-4 standard tank engines, No. 80011, was inspected by the technical press at Marylebone Station. A total of

54 of these locomotives is included in the 1951 locomotive building programme, 44 of which are to be built by the Southern Region at Brighton, and ten by the London Midland Region at Derby. The first three locomotives have been completed and have been allocated to the Southern Region for service at Tunbridge Wells. The locomotives were described and illustrated in our August 3 issue.

**Bomb in Spanish Tunnel.**—A small bomb exploded recently inside a tunnel about 30 miles from Barcelona as a Barcelona-Corunna express was passing through. A coach was derailed, but no casualties were reported. Another bomb, which exploded outside the tunnel, brought down two telegraph poles. The incident took place between Manresa and Bajadell.

**Birstall Town Station Closed to Passenger Traffic.**—The passenger train service was withdrawn from Birstall Town Station in the North Eastern Region on August 1. Bus services are operated by the Yorkshire Woollen District Transport Co. Ltd. between Birstall and Leeds, Gomersal, Cleckheaton, Huddersfield, Batley, Dewsbury, and Bradford, and rail passengers can be booked to and from the most convenient of these stations. Parcels traffic is dealt with at Batley Station.

**Welding Plant Exhibits.**—From the comprehensive range of a.c. welding equipment manufactured by the General Electric Co. Ltd., portable single-phase and twin-arc welding sets will be on view at the Engineering, Marine & Welding Exhibition. The portable twin-arc equipment represents an important advance in a.c. welding plant and is the outcome of exhaustive experimental and development work undertaken with a view to producing a.c. equipment which would take a balanced three-phase load from the supply at a high power factor without the additional expense of a power factor correcting capacitor. Arrangements are in hand between the General Electric Co. Ltd. and

the Quasi-Arc Co. Ltd. whereby the latter company will become the sole concessionaires for the equipment.

**United Railways of Havana.**—On August 9 the Prime Minister of Cuba announced that an extraordinary session of Congress would be convened for August 20, and among the urgent matters to be resolved would be the nationalisation of the United Railways of Havana. This, he said, would be treated in a separate presidential message to Congress containing essential articles for a nationalisation Bill, the enactment of which the President would ask. Ordinarily Congress would not have met until September 17.

**B.O.A.C. Shows a Profit.**—British Overseas Airways Corporation announces a profit of £40,000 during the period April to June this year. This was the first quarterly operating profit since the corporation was formed in 1940. The accounts for the financial year 1950-51 may show an improvement of more than £3,000,000 when compared with those for the previous year. The corporation states that, whereas in March, 1949, every aircraft would have needed to fly full to break even financially, today a 70 per cent. load is sufficient, and that figure is commercially realisable. Staff has been reduced from 23,300 in March, 1948, to approximately 16,000.

**Skefko Ball Bearing Co. Ltd.**—The directors of the Skefko Ball Bearing Co. Ltd. are considering applying to the Capital Issues Committee in the near future for permission for a right offer of 400,000 ordinary 5s. shares in the proportion of one new share for every eight ordinary stock units held.

**Patent Shaft & Axletree Co. Ltd.**—The Iron & Steel Corporation of Great Britain announces the reconstitution of the board of the Patent Shaft & Axletree Co. Ltd., one of the publicly-owned iron and steel companies, which before nationalisation

was a wholly-owned subsidiary of the Metropolitan Cammell Carriage & Wagon Co. Ltd., the board consisting of eight part-time and one full-time director. The new board will consist of four full-time and three part-time directors. Sir Archibald Boyd, Mr. A. T. Cheesley, and Mr. H. N. Edwards have agreed to continue as part-time directors, and Sir Archibald Boyd will act as Chairman. Mr. B. S. Prichard, Managing Director, will also continue as a member of the board. In the light of the changed circumstances, the remaining directors who were part-time directors have retired, and the corporation wishes to express its appreciation of their services.

**Sentinel (Shrewsbury) Limited.**—The net profit for the year ended March 31 of Sentinel (Shrewsbury) Limited amounted to £22,953, as compared with £15,778 for the previous year, after providing £41,171 for tax. With £157,413 brought forward, with £26,288 profit attributable to previous years, there is available £206,654. There is to be an ordinary dividend payment of 5 per cent. and £179,776 is carried forward to next year.

**Thurso Autumn Sheep Sales.**—On August 10 the last of the special trains with animals from the autumn sheep sales at Thurso in the Scottish Region reached Inverness on their way to the south. During the four-day sheep sales at Thurso 24,000 sheep passed through the market. Over 20,000 animals have been railed to Edinburgh, Glasgow, Carlisle, and places in England, and eight special trains were required to move the sheep, which were conveyed in 350 trucks.

**Channel Tunnel Co. Ltd.**—The seventieth annual general meeting of the Channel Tunnel Co. Ltd. was held in London on August 7, the Chairman, Mr. L. D'Erlanger, presiding. The company's income from investments was slightly higher, at £947. The value of investments was £17,322. For some years, expenditure on experimental tunnel workings and other activities has remained at £89,152. Dividend to shareholders remains at nil. The Chairman reported that the board continually received evidence of world-wide interest in the Channel Tunnel project, and that it was manifest that "responsible opinion on both sides of the Channel favours the construction of the tunnel both on economic and political grounds."

## Railway Stock Market

The heavy fall in stock markets which followed the first shock of the dividend limitation proposals has been followed by a rapid recovery in industrial share values. Contrary to some forecasts, there has been no heavy selling and no large-scale exchanging into shares which have a satisfactory dividend standard under the Gaitskell plan, although there are many factors which investors have to consider apart from immediate dividend return. Many companies which did well last year may face very different conditions in a few years owing to increasing competition in export markets. Results for many companies in 1950-51 may have reached peak levels and in any case 1952 might bring reduced dividends. In many quarters it is believed that dividend limitation in its proposed form will have to undergo many amendments before it becomes law.

Second thoughts on the White Paper on dividend limitation emphasise the many uncertainties that exist. It now seems that companies which have distributed special tax-free payments from profits on investment sales can have these payments included in calculating their maximum payments under the Gaitskell plan. Moreover, some interpretations are that companies out of the dividend list may be permitted to resume payments with a higher payment than 5 per cent. which had previously been thought to be their permitted maximum. They may be permitted to pay up to the average of the dividends paid for the two last years when they were in the dividend list. But it is becoming increasingly clear that, until dividend control actually becomes law, which cannot be before December at the earliest, many companies will remain uncertain as to their position. Meanwhile, there is the possibility of a General Election.

Foreign rail stocks have continued to attract rather more attention together with most other securities which are unaffected by the dividend plan. There has been a general uptrend in United of Havana stocks, particularly the 1906 debentures, which have risen to 22½ at the time of writing and have been in strong speculative demand on suggestions that they may prove to be worth up to 30, assuming that the nationalisation take-over terms are reasonable. Hopes of the latter have been increased by the Anglo-Cuban trade

agreement. Although the fact that the British Government is keeping in close touch with the discussion is a hopeful point, nevertheless even if terms are reasonable, it cannot be assumed that there will necessarily be an early pay-out for United of Havana stockholders, despite nationalisation of the railway.

Antofagasta stocks were prominent again, rising further on balance, but best levels were not fully held. The ordinary stock has risen sharply to 15½ at the time of writing and the preference to 74. Rise in the ordinary stock reflects the view that there might be a scheme for funding the arrears of preference dividends; but in any case it seems it must be some time before ordinary dividends could be resumed. Both stocks are much undervalued in relation to the value of the assets; and should there ever be nationalisation, stockholders would be confidently expected to receive much more than the current market prices for their stocks.

Leopoldina stocks were again rather more active with the ordinary at 10½, the preference 26½, the 4 per cent. debentures 94, and the 6½ per cent. debentures 141½. San Paulo 10s. units have eased to 15s. 3d., although the annual report does not hold out hopes of any early settlement of long outstanding claims for additional compensation. Canadian Pacific have risen further to 59½ partly on the expanding Canadian oil developments.

Road transport shares remained steady because they are generally unaffected by the Gaitskell dividend limitation plan. Engineering shares rallied, and these included Vickers at 49s. 1½d. and T. W. Ward at 71s., while B.S.A. were up to 42s. and Babcock & Wilcox 75s. 9d.

Vulcan Foundry were 28s. 9d., North British Locomotive 19s., Gloucester Wagon 16s. 6d., Beyer Peacock 31s. 3d., Hurst Nelson 61s. 6d., Birmingham Carriage 36s. 6d., Charles Roberts 99s. 4½d., and Wagon Repairs 5s. shares 14s. 9d.

**DORADA RAILWAY CO. LTD.**—The directors of the Dorada Railway Co. Ltd. have decided not to pay a dividend in respect of 1950 pending final result of the lawsuit mentioned in previous reports. For 1949 six per cent., less tax, was paid on the £604,347 issued capital. Operating profit for the year was £60,774 against £33,119. Taxation takes £29,404 and £19,245 is carried forward.

## Forthcoming Meetings

August 18 (Sat.).—Permanent Way Institution, London Section, visit to Barclay Perkins & Co. Ltd. Southwark Brewery. Members of the party will assemble at London Bridge Station at 1.30 p.m.

August 21 (Tue.).—Permanent Way Institution, Leeds Section, evening visit to York Station to inspect the new signalling installation.

August 22 (Wed.) to September 1 (Sat.).—The Model Engineer Exhibition, at the New Royal Horticultural Hall, Westminster, S.W.1.

August 25 (Sat.).—Permanent Way Institution, London Section, visit to Barclay Perkins & Co. Ltd. Southwark Brewery. Members of the party will assemble at London Bridge Station at 1.30 p.m.

Traffic Table of Overseas and Foreign Railways

Railway	Miles open	Week ended	Traffics for week		No. of week	Aggregate traffics to date				
			Total this year	Inc. or dec. compared with 1949/50		Total	Increase or decrease			
						1950/51				
South & Cen. America	Ancofagasta ...	811	3.8.51	£141,590	+	£72,710	31	£3,662,950	+	£1,775,396
	Costa Rica ...	281	May, 1951	£566,653	+	£467,774	47	£10,178,533	+	£694,685
	Dorada ...	70	June, 1951	36,543	+	12,762	26	213,760	—	17,412
	Inter. Ctl. Amer. ...	794	June, 1951	\$1,032,974	+	\$83,457	26	\$6,931,651	+	\$99,579
	Paraguay Cent. ...	274	3.8.51	/326,693	+	£171,218	5	£1,538,403	+	/611,836
	Peru Corp. ...	1,050	July, 1951	\$7,925,000	+	\$450,000	4	\$7,925,000	+	\$450,000
	(Bolivian Section)	66	July, 1951	Bs. 13,029,000	+	Bs. 5,468,000	4	Bs. 13,029,000	+	Bs. 5,468,000
	Salvador ...	100	May, 1951	£138,000	+	£31,000	48	£1,867,000	+	£136,000
	Taltal ...	147	July, 1951	\$1,790,000	+	\$558,100	4	\$1,790,000	+	\$558,100
	Canada	Canadian National†	23,473	May, 1951	17,653,000	+	1,809,000	22	82,112,000	+
Canadian Pacific†		17,037	June, 1951	12,146,000	+	1,372,000	26	68,992,000	+	9,890,000
Various	Barsi Light* ...	167	June, 1951	30,435	+	1,447	13	113,112	+	23,872
	Egyptian Delta ...	607	10.4.51	17,513	—	267	4	17,513	—	267
	Gold Coast ...	536	June, 1951	246,509	+	10,058	13	803,671	+	81,153
	Mid. of W. Australia	277	May, 1951	55,547	+	19,139	48	454,081	+	108,823
	South Africa ...	13,398	7.7.51	1,910,359	+	213,406	14	26,373,368	+	4,149,934
	Victoria ...	4,744	Mar., 1951	1,811,748	—	163,026	39	—	—	—

\* Receipts are calculated at 1s. 6d. to the rupee

† Calculated at \$3 to £1